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Canine Distemper.

Discussion by the Section of Comparative Medicine of the Royal Society of Medicine.*

Mr. THOMAS DALLING: My remarks will be confined to the question of active immunisation, and will deal mainly with our own experiences and those of the members of the medical and veterinary professions who have made use of the antigens made by us.

The method of immunisation devised by Laidlaw and Dunkin consists in the injection of a vaccine prepared by inactivating with formalin the virus in the tissues of dogs injected with virus and destroyed at the critical point of infection, followed in seven days by the injection of a small dose of living distemper virus in the form of an emulsion of ferret spleen, the whole course being carried out under strict conditions of isolation of the subject, etc. In a series of over 2,000 dogs, these workers showed that this method was effective in at least 99 per cent. of cases.

It was at this time that we were asked to undertake the making and issue of the prophylactics on a large scale, to members of the medical and veterinary professions. Our experiences, however, cover the use of the antigens on many thousands of dogs all over the country, and refer to vaccine and virus used on a commercial scale more than on an experimental scale.

They confirm those of Laidlaw and Dunkin in that the antigens devised by them do produce an active immunity to natural and artificial infection with distemper virus, and that, provided potent vaccine and virus are used, the method is successful to a very high degree.

On the whole, the results of the use of the prophylactics appear to have been good. Naturally, we did not expect that 100 per cent. efficiency would be recorded from their use, and we expected to hear of failures. It is with these failures that we are chiefly concerned now. That some veterinary surgeons have apparently had nothing but excellent results is evident from some of the reports received. For example, a veterinary surgeon who had used 28 doses at various times, says that all his cases have been absolutely without incident, and places a high value on the efficacy of the vaccine. Another writes that after using 140 doses, he has had 100 per cent. success, and that he has inoculated three kennels of foxhounds, and in each case the Master of the Hunt has seen fit to speak in public on the efficacy of the vaccine. Again, after the use of 217 doses the report is that it is 100 per cent. successful. Recording good results from the use of 87 doses, a member of the profession says that his experiences are that it gives satisfactory results in more than 99 per cent. of cases, and that if care is taken that the dogs are in good health at the time of inoculation, the method is 100 per cent. successful and free from risk. These are a few of the good results culled from the reports received.

There have been, however, a number of untoward happenings which may conveniently be divided into three groups: (*a*) illness following immediately after the injection of vaccine or virus, or both; (*b*) nervous disturbances following the use of the prophylactics immediately or months later; (*c*) breakdown in immunity a considerable time after the use of the prophylactics.

Illness following immediately after the injection of vaccine or virus, or both.—Our experience at the laboratory and that of probably 95 per cent. of veterinary surgeons is that the administration of vaccine is followed by little or no departure from normal health, provided that the dogs at the time of receiving the vaccine are healthy and have not been recently exposed to infection of any kind. Occasionally an unpleasant report of illness after vaccine administration is received. For example, we have a record of a whole kennel of eight dogs suffering unduly 14 days after the injection of vaccine. Without virus having been given, all the dogs showed what the veterinary surgeon described as "definite symptoms of distemper," and five died. Our records show, however, that illnesses following the use of vaccine are very rare indeed. When virus is injected seven or more days after vaccine, in a proportion of cases there is evidence of a disturbance of the general health of the subject in that, within a week, there may be a rise in temperature, lack of appetite, watery discharges from the eyes and nose and a slight diarrhœa. As a rule these symptoms pass off and the dog soon returns to normal health. In some subjects these symptoms may be exaggerated, and the dog may be severely affected, and is only by careful nursing restored to health, while in other cases actual death takes place within 10 or 14 days after the use of virus. It is exceptional to find an exaggeration of the more or less slight disturbance from normal health, but it does occur, and in their original instructions issued with vaccine and virus Laidlaw and Dunkin state that "experience shows that the risk of death from double vaccination is less than 1 per cent." The reports of illness and death following the injection of virus may refer to one individual dog in a kennel in which any number up to 20 or 30 are being immunised at the same time, or on the other hand it may refer to almost every dog in the kennel which received the virus at the same time. Reports of the former nature call for little comment except that the individual concerned was in some way more susceptible to the action of the virus than his fellows. In the latter case, however, a more serious view must be taken, and we have, as far as possible, investigated the mishap and tried to come to some conclusion as to its cause.

Nervous disturbances following the use of the prophylactics immediately, or months later.—Attributed to the effects of vaccine and virus are fits of all degrees and

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DEPT. OF VET. MEDICINE

variety. It has been assumed by some veterinary surgeons that hysteria has been actually caused by vaccine or virus, or that the injection of these materials has in some ways predisposed to the development of hysteria. Symptoms of hysteria have in some cases been noted on the day following the use of vaccine; in other cases they have appeared within a week of the use of virus, while in further cases their appearance has been noted weeks or months later. The same remarks apply to fits usually described as "distemper fits." In rare cases chorea symptoms have been noted, following the milder evidence of distemper in immunised dogs, and in one case a veterinary surgeon describes a true encephalitis, confirmed by examination of sections of brain. The suggestion is that these conditions are either directly or indirectly related to the use of vaccine and virus. It has also been suggested in the case of fits developing months after the course of immunisation that their occurrence is evidence of a breakdown in immunity, the assumption being that the occurrence of fits is more or less diagnostic of a distemper infection.

Breakdown in immunity a considerable time after the use of the prophylactics.—A number of reports have been received describing diseases in immunised dogs which the owners and the veterinary surgeon have called distemper; in other words, there has been in these cases an apparent breakdown in the immunity produced by the injection of the vaccine and virus. We have been specially interested in these reports and have, wherever practicable, visited the sick animals, or received material, such as swabs of nasal and eye discharges, spleens, etc. The alleged breakdowns refer to single dogs owned by private individuals as well as to groups of dogs in kennels, especially hunt kennels, the hounds of which were inoculated as puppies at walk and became sick when introduced into the kennels at a later period. Most of the research work we have carried out has been on material received from such cases. We have a considerable amount of evidence to show that the active immunity described by Laidlaw and Dunkin is borne out by field results. For example, the following are typical of many reports we have had. A veterinary surgeon, describing his results of immunising 40 foxhounds, says that after introduction to the kennels they have been in contact with dogs affected with distemper and none have contracted the disease. Another veterinary surgeon says that he definitely exposed two vaccinated hound puppies to distemper infection and no signs of illness were observed in either pup. Writing on the results of inoculating 20 dogs, a member of the profession states that all the dogs have gone on remarkably well notwithstanding that the kennels in which they are now housed are hotbeds of distemper. A further example is given by a veterinary surgeon who, in February last year, inoculated 20 foxhounds, which all resisted distemper when it broke out in the kennels later in the spring. As opposed to these good results, the following examples may be quoted as typical of the alleged breakdowns. Two retriever pups were inoculated by a veterinary surgeon in July; in September both pups were reported as having contracted "distemper" and one died. Thirty-four couples of foxhound puppies were inoculated at walk by a veterinary surgeon; six months later they were brought to the kennels, in which distemper was present. Sixteen of the puppies developed distemper and two died. Another case relates to an outbreak of distemper, described as a "perfect picture of distemper" among 78 foxhound puppies, inoculated at walk and returned to the kennels some months later. These examples could be multiplied, but these will serve as an indication of the results experienced.

Some possible explanations of mishaps: (1) *Quality of vaccine and virus.*—The important point in the consideration of mishaps or failures is the quality of the vaccine and virus used. Laidlaw and Dunkin laid down a method of testing vaccine and, as far as possible under conditions attending the making and testing of large amounts, we have adhered to their method, and have only issued vaccine which has, in our hands, fulfilled the requirements of the test. It can readily be understood that this has meant the discarding of a proportion of the vaccine made, as we have not been able to show that all the batches made were up to the standard laid down. These of course were not issued. In the making and testing of batches of vaccine, many important points have to be learned by experience, *e.g.*, the exact time at which to obtain the tissues so that they will contain the maximum amount of virus, etc. We feel, however, that we are now acquainted with the various pitfalls in the making and testing of vaccine, so that the task is not now so arduous. A further difficulty we have experienced is in preserving the living virus so that it will reach the injector's hands in a fully potent condition. It is essential to the Laidlaw-Dunkin method that the injection of one dose of vaccine should be followed by the use of living virus, in order to obtain the greatest degree of immunity. We are not satisfied, even now, that the method we have adopted in the issuing of the living virus is the best conceivable, and we are still carrying out experiments to discover if the present method of issuing virus can be improved in order that it may be more fully potent when used as a second injection.

(2) *Condition of the dog and exposure to infection.*—A possible explanation of some of the mishaps, especially those relating to the occurrence of so-called distemper or exaggerated reactions after vaccine and virus, is the inoculation of dogs which have been recently exposed to infection, especially with naturally occurring distemper virus, and are, in all probability, in the incubative stages. Great care has been taken in the formulating of instructions for the guidance of the immuniser and particular stress is laid on the recording of temperatures before immunisation is begun and during the whole course. An elevated temperature must be taken as some guide to infection with naturally occurring distemper virus or other organisms and serves as an indication to withhold the administration of vaccine or virus. A considerable amount of evidence has been accumulated on this point and shows that many mishaps soon after the administration of virus have been due to a disregard of this important instruction. The careful veterinary surgeon who insists on an accurate record of the temperatures being kept before the dogs are subjected to the treatment, usually escapes any untoward results following the use of vaccine and virus. One veterinary surgeon says he insists that the owner should take the temperatures twice a day before the first injection, and in several cases in which he had doubts of this having been done, he declined to use the vaccine. We have also records showing that dogs have been definitely exposed to dis-

temper infection during their course of vaccination. An example of this occurred in the practice of a veterinary surgeon who discovered, after he had inoculated several couples of foxhounds in the kennels, that they were on a run in which dogs had recently died from distemper infection. The method is perfectly safe as far as setting up of diseases in dogs is concerned, provided the dogs are suitable subjects for inoculation, and that the instructions laid down are carried out. The use of a living virus calls for the strictest attention to detail, and more care is required in its use than in the use of an ordinary dead or killed vaccine.

(3) *Age of treated dogs.*—It is recommended by the originators of the method that puppies should be three or four months old before immunisation is carried out and this is the advice we give when consulted on the point. We have records of dogs being injected at all ages, from six weeks upwards, with varying results. Personally, we are of opinion that while puppies are still suckling, the possibility of maternal immunity transmitted in the milk must not be overlooked. It seems possible that in some cases a sufficient number of antibodies will be transmitted to vitiate the antigenic action of the injected vaccine and virus. The usual history of the results of the inoculation of such young puppies is that they showed no reaction whatever to the vaccine or virus. It is difficult to predict how these puppies will behave when exposed to natural infection at a later date. We are now carrying out experiments to obtain evidence on this point. It would appear also from the experiences of other veterinary surgeons that dogs older than three or four months suffer more reaction from virus than do younger dogs.

(4) *Wrong diagnosis.*—We have carried out *post-mortem* examinations on a large number of dogs which have died either as a sequel to the use of vaccine and virus, or to an attack of so-called distemper some time after inoculation, and, in addition, have examined a considerable amount of material received, in the form of nasal discharges, etc., on swabs. Laidlaw and Dunkin have shown conclusively that the occurrence of the distemper virus in a tissue can, under laboratory conditions, be detected by the use of the highly susceptible ferret. In alleged breakdowns it is therefore a fairly simple matter to prove whether or not the distemper virus is present. Spleen tissue, blood taken from the dog while the temperature is high, or nasal discharges in the initial stages of the infection in an infected dog, contain an abundant supply of distemper virus. The behaviour of a ferret injected with any of these materials should prove definitely whether or not the virus was present in the dog. The sum total of our work up to date is that in a small percentage of the cases examined we are satisfied that the distemper virus existed in the tissues of the immunised dog examined by us, and in these it must be considered that the immunity produced was insufficient to protect against natural infection. I understand from Dr. Laidlaw and Mr. Dunkin that they have also been able to show the presence of the virus in the tissues of some immunised dogs which have later suffered from distemper owing to a "breakdown of immunity." In some cases of apparent breakdown in which we have failed to demonstrate the presence of the distemper virus, the symptoms shown were closely allied to those produced in susceptible dogs by injection with distemper virus. From our investigation work we conclude that symptoms of disease which may be confused with those produced by the virus of distemper, may be produced by causes other than the distemper virus. In confirmation of this I may refer to an experience at the laboratory. An epidemic occurred among some dogs in isolation, previous to their being used for the production and testing of distemper vaccine. It was characterised by nasal and eye discharges, coughs, diarrhœa, high temperature, etc., and several dogs died. The opinion of several veterinary surgeons was that the disease was distemper. The *post-mortem* examinations showed the presence of pneumonia in various stages. A careful search was made for the distemper virus in the discharges of the living dogs, in the blood of the living dogs, and in the spleens of dogs specially killed in all stages of the disease. The results were entirely negative, but a hæmolytic streptococcus was isolated in pure culture from the lungs of most of the dogs. It is worthy of note that a hæmolytic streptococcus has been isolated, mostly in pure culture, from the lungs of immunised dogs which have subsequently developed so-called distemper. In some cases the virus was also demonstrated in the tissues.

The general opinion in the past has been that the virus of distemper is the primary cause of all diseases classified as distemper, and that other conditions affecting dogs are due to a secondary cause acting in the presence of the virus of distemper. Without doubt, in the field, true virus disease does exist, but more commonly secondary organisms invade the tissues and give rise to lesions, etc., which may cause the death of the animal. In addition, however, in our opinion some, at least, of these so-called secondary conditions may exist as primary, without the presence, at any stage, of the distemper virus. It is known, for example, that *Bacillus bronchisepticus* may infect dogs and produce evidence of clinical distemper without the association of the distemper virus. We, ourselves, have been able to infect dogs proved to be highly immune against the distemper virus, with cultures of this organism, and it was the opinion of several veterinary surgeons who saw the cases that the symptoms set up were those of canine distemper. At the present moment it would appear that *Bacillus bronchisepticus* is rare in this country, but some years ago it was the simplest matter to isolate this organism from dogs affected clinically with distemper. It is possible that such a disease as bronchisepticus infection may appear as a wave of infection.

From these and other observations, I am of the opinion that we should not assume that all cases of alleged failures after immunisation should be classified as distemper. Without doubt some are true failures, in that the virus can be demonstrated in the tissues, but there remains the group in which the virus cannot be found in dogs in any stage of the disease but in which organisms in pure culture can be isolated. A further study of such conditions is indicated, and the valuable ferret test devised by Laidlaw and Dunkin is of the utmost assistance in guiding one as to the cause of any outbreak simulating distemper.

Mr. George W. Dunkin: The title of this discussion was at first, "The Present Position of Distemper Immunity," but more recently it has been called "Canine Distemper." It is, however, the subject of immunity which should be discussed, owing to the publicity given

to it, particularly in the lay press. In my own view, the position to-day is precisely the same as it was a year ago. That is to say, it is possible to confer an active and lasting immunity on dogs and ferrets by means of suitable agents. Just over a year ago my colleague, Dr. P. P. Laidlaw, and myself published our findings, based not only on a considerable number of laboratory experiments carried out with meticulous care and under almost ideal conditions, but also on a large field experience covering some 2,000 dogs and hounds scattered over various parts of the United Kingdom and treated by over 90 veterinary surgeons. A complete record was obtained of these cases and it was found on analysis that deaths from all causes following on the inoculations amounted to less than one per cent. More recently, as has been stated by Mr. Dalling on several occasions, the work of manufacturing and distributing the products has been undertaken commercially and many thousands of doses of vaccine and virus have been distributed.

It has been said on more than one occasion that the clinical symptoms of distemper as seen in the field and those which have been described as experimental distemper, have certain differences. It is not surprising that differences of this nature should occur, for on the one hand we have a disease occurring in perfectly natural conditions and in places and surroundings which might invite complications; on the other hand, the disease is carefully controlled and the symptoms seen are those of the simple type uncomplicated by other pathogenic organisms. In our experience the most common secondary invader is a streptococcus, and pneumonia is commonly seen in cases where this organism is found. I believe I am correct when I say that in all our experimental work we have only seen one case of pneumonia.

It is a well-known fact that pneumonia is a common complication of ordinary field distemper, and deaths are usually brought about in this way except in those cases which show evidence of cerebral infection. Even in these pneumonia may be present.

In view of this admitted difference in the *post-mortem* findings of field and experimental distemper, it was thought by some that we had not been dealing with that form of distemper which the clinician is called upon to treat in his daily work. It is true that the majority of dogs which have recovered from a natural attack of distemper appear to be immune to further attacks, even though cases with which they are subsequently in contact are the subjects of streptococcic and other bacterial infections, in addition to the virus of distemper. Practical experience has shown that vaccination with any of the many bacterial vaccines on the market will not protect against distemper, for although they have been in use many years, the disease continues its sway and takes its usual toll. The question therefore which remains to be settled is: "Will dogs which have been immunised against distemper by the vaccine-virus method also be protected against the bacterial infections which are seen in the field?" It was largely for this reason that a certain amount of field work was undertaken after our laboratory experiments had given us some encouragement, but it is only recently, as one might expect, that evidence on this point has been forthcoming. I have been privileged recently in visiting five large foxhounds kennels in such widely separated districts as Scotland, Yorkshire, Bedfordshire, Wiltshire and Devon. In all these kennels young hounds were going down with distemper. It is agreed by all veterinarians that the absolute and certain diagnosis of distemper as it occurs in the field is not an easy matter and although the cases which I saw in these kennels strongly supported the view expressed by the Masters, their kennel huntsmen, and the visiting veterinary surgeons, it remained to be proved beyond cavil that such was the case. In many instances we have succeeded in proving the presence of the virus of distemper by the injection of emulsions of spleen from the carcasses of dead hounds. It is fair to say that quite 99 per cent. of all the hounds which have been examined have had pneumonia, so that there was a double infection at least. In all these kennels there were also older hounds which had either recovered from naturally occurring attacks or had been immunised over a year ago. There appears to have been no case of breakdown among these hounds and the opportunity of contracting infection was present daily. It is not possible in most kennels of foxhounds to isolate sick from healthy hounds, for even in those kennels where a hospital has been provided, indirect infection is probable and segregation of attendants is not practicable.

As a result of my series of visits I am satisfied that a dog or hound which has been protected by the injection of a vaccine of good quality, followed by living virus, is not only protected against distemper, but against the usual secondary infections met with in such cases.

The question of breakdown in immunity has to be referred to. As far as our own experiences are concerned, I have said that deaths from all causes amounted to less than 1 per cent., and this applies to the series which we reported in November, 1928. Since then we have had one other case—a Japanese spaniel—which developed illness and subsequently died. In life this little animal showed all the signs of distemper and we succeeded in obtaining proof of the presence of the virus of distemper from the blood and the eye washings. This case must be added to the list of breakdowns. Reputed breakdowns have occurred on a somewhat larger scale since the production of the vaccine and virus was placed on a commercial basis, and it is necessary that one should not come hastily to a conclusion as to the cause. In referring to these reputed breakdowns one must make reference at this stage to the clinical symptoms of distemper. I have already stated that the certain diagnosis of this condition is by no means easy, and I am quite sure that the experienced canine surgeon will be the last to hold dogmatic views on such a debatable point. Apart from nervous affections simulating distemper, we have to differentiate it from *Bacillus bronchisepticus* and streptococcic infection, and this cannot be done with certainty without the aid of the laboratory.

The preparation of the agents under discussion is one which requires infinite care. The patients must be carefully selected at the proper time. The tissues must be collected under strict aseptic conditions and carefully tested for sterility before issue. The vaccine must be tested for protective properties on dogs known to be susceptible, for it is not uncommon to prepare a vaccine with all the stated precautions only to find on test that it is useless. The virus, being a suspension of distemper ferret-spleen, must be collected from ferrets which are suffering from

distemper and distemper only, and its potency must be known. Finally, neither product must be used on dogs which are not in a perfect state of health, and a careful temperature record both during and before vaccination should be made. The preparation of these agents on a commercial scale must, I should imagine, be a much more difficult matter than its manufacture on a smaller laboratory scale, and doubtless the difficulties are great. It is necessary, for example, to have on hand a supply of vaccine whenever it is demanded; this applies to virus also, and, since the virus of distemper is unstable, I can see at least some of the difficulties with which the manufacturers have to contend. Fortunately it is none of my business to clear up these difficulties, and I only make reference to those which I believe may be the more serious ones, because it is necessary to ascertain exactly the cause of the recent breakdowns. It is not possible at the moment to say definitely what the cause is, but doubtless those who have the manufacture of the products in hand will decide this point. One thing is clear, and that is that a state of immunity which is active and durable can be induced in susceptible dogs by means of the process referred to. I do not believe that a lasting immunity can be conferred by the injection of vaccine without living virus, at least not by one injection. Whether multiple doses of vaccine will bring about this desirable state of affairs no one can yet say, for to prove such a point it would be necessary to vaccinate a group of dogs known to be susceptible, to keep them absolutely isolated and, after varying periods extending to several years, test them for immunity with virus of a known virulence.

Mr. Dalling has referred to certain complaints which have come to his notice, and I should like to comment on one of them, namely, "illness following immediately after the injection of vaccine." It does not seem to have been sufficiently understood that the vaccine, properly prepared, cannot give rise to any illness. It consists of a 20 per cent. suspension of finely minced dog-tissue containing originally living distemper virus which has been killed by the action of a certain amount of formalin. It has been observed that the presence of the formalin appeared to induce certain irritant effects after injection, and therefore a small amount of ammonia is now added, sufficient to bring the pH up to about eight, thus converting all free formaldehyde into urotropine in order to avoid this undesirable effect.

Illness immediately following the injection of vaccine must, therefore, have a cause other than the mere introduction of this material (I do not refer to the incidence of local abscess but to systemic disturbances). In the event of a dog developing symptoms of distemper at this stage of the process before virus is given, there is, in my opinion, only one explanation, and that is that the patient was in the incubative stages of the disease when he received the vaccine. It was for this reason that in certain cases when the procedure was practicable, the taking of bi-daily temperatures for about a week before vaccination was advocated. In the case of individual and possibly valuable animals this can be done. The possession of such a record by the veterinarian provides an invaluable guide as to whether he shall or shall not proceed with the vaccination process. Severe illness immediately following the introduction of virus is due to one of two causes—distemper or some other infection. If the latter, then clearly neither vaccine nor virus can be held to blame, for on the one hand we have material which consists of dead virus suspended in homologous tissue, and on the other, living distemper virus suspended in finely minced ferret spleen. If the illness is distemper then the cause is due either to the hypersensitiveness of the patient, or to the fact that insufficient protection has been afforded by the vaccine previously injected.

Dr. S. G. Billington said that he had been investigating canine distemper for seven years. The objectives had been: (1) to isolate the causal organism; (2) to evolve a curative remedy; (3) to consider the question of prevention.

With regard to the causal organism, he had come to the conclusion that it was the filter-passing stage of the *Bacillus bronchisepticus*, and for six years he had had the three stages of filter passer, bacillus, and intermediate leptothrix, growing and reproducing as such, or being converted into the other stages at will.

With regard to the curative remedy: in the practical consideration of any curative product, there were obviously three clinical groups of distemper: (i) the very early, pre-secondarily infected cases; (ii) the pre-moribund cases, but with superadded secondary infections; (iii) the moribund cases. Group (iii) could be dismissed, and the great majority of the remainder as met with by the practising clinician would be in group (ii).

For several years curative vaccines for the three stages had been used and the results critically watched. Vaccines of filter passer and leptothrix consistently controlled the early, uncomplicated disease, but in cases with superadded secondary infections the results were variable and uncertain. As, however, this group was much the largest one met with in practice, it was the most important one, and there appeared to be two methods of approach: (1) to produce a blunderbuss vaccine containing the common complicating organisms, or preferably (2) to isolate and extract that something known as "natural immunity" as existing in the serum of the naturally immune mongrel.[1]

The product termed curative distemper inoculin was virtually "concentrated natural immunity," and distemper in the pre-moribund stages was controlled in an extremely high percentage.

With regard to a preventative—most preventative vaccinations were effective for a period only. With a disease like distemper, which was always with the canine community, to be of practical utility it must be permanent.

He (Dr. Billington) had decided to await the results in susceptible dogs which had survived distemper owing to the help of an anti-distemper remedy. The following results were typical of a number observed: Four years ago, a pack of foxhounds had developed distemper. With the use of a curative vaccine the mortality was *nil*. In the usual spring outbreak a year later, about 20 per cent. of the dogs cured the year before, contracted the disease, probably representing about half the number that would have died without the help of the curative vaccine. One could not hope to get any preventative vaccination more potent than an attack of the disease, and, consequently, no attempt to produce a preventative had been made. He thought that the weakness was an endocrine one, resulting in failure to retain the acquired immunity.

(1) *Medical World*, 1929, xxix, 310.

Mr. A. A. Comerford said that during the three years in which he had used this treatment he had obtained favourable results until recently, and he would like to refer to three packs of foxhounds treated in August, 1929. One pack had, so far, shown no bad results. In another, early in 1930, distemper had been reported, though personally he was inclined to doubt its presence. The affected hounds ran temperatures up to 104°, and had discharges from eyes and nose, but never lost their appetities or their spirits, and though a few casualties occurred, a ferret survived all attempts at infection. The third pack undoubtedly had a definite outbreak of distemper with all the clinical symptoms, and a ferret which was allowed to run about the kennel for ten minutes every day while the sick hounds were out in the yard, showed clinical distemper symptoms on the 16th day. This was undoubtedly a breakdown, and he (the speaker) would like to ask Mr. Dalling one question: Was he quite confident that the virus (used within the time limit specified on the label attached to each vial) was potent? One reason why he was inclined to doubt that conclusion was suggested by an experience last summer when he was immunising a litter of puppies eight weeks old. Through a mistake on the kennelman's part, another litter was put into the kennel containing the puppies which had just received their dose of virus. No bad results followed amongst the non-vaccinated puppies, though there was every reason to believe that those which had received the virus should have been infective if the virus had been potent. With reference to the duration of immunity, he, personally, could vouch for foxhounds immunised three years previously who had stood up against several outbreaks without any symptoms developing, and he had no hesitation in stating that in his opinion that immunity was for life.

Dr. R. A. O'Brien said he was deeply interested in the point Mr. Comerford raised. Virus was unstable. It was much easier to be perfectly sure that the virus reached the injector fully potent and alive when, as during the experimental period when Dr. Laidlaw and Mr. Dunkin were sending out virus, they kept the material frozen hard until the last moment and dispatched it when they chose. Mr. Dalling did this also during the experimental issue of 2,000 doses at the commencement of his work. But later when it became necessary to meet a large demand and to have the virus constantly available, the difficulties became great, and it was quite possible, as Mr. Comerford suggested, that in some few instances the virus was not fully potent when it reached the dog. Mr. Dalling was again investigating this point. By keeping the material frozen hard until the last moment and by shortening the period during which a batch of virus might be used, it would probably be possible to continue safely the issue of the liquid virus. If not, it could probably be issued dry after full tests; there was still another method being tried. The articles in the daily press had been mentioned. It was wise to preserve a sense of proportion and of fairness. The inquiry sent to veterinary surgeons recently had yielded reports relating to about 12,000 injections. The total complaints, mostly of alleged failures of immunity at a later date—even if they debited every one against the prophylactic—amounted to 8 per cent. and the total deaths to 2 per cent.

Mr. P. P. Laidlaw said that the reputed breakdowns in immunity formed, for him, the most interesting aspect of the discussion. He believed that in the great majority of cases a dog which had survived distemper was immune for life, and, indeed, the justification for the injection of living virus, as a final step in the immunisation process, was based on this conception. Distemper which appeared in an animal which had once received living virus was thus, for him, of the greatest interest. The diagnosis of distemper was often difficult and the differentiation of pneumonia from distemper complicated by pneumonia seemed almost impossible. It was sometimes possible, however, to secure proof of a distemper attack by the transference of a typical disease to a susceptible animal—such as a ferret—utilising material from a sick dog. When the result of such an inoculation was positive, there could be no doubt as to the interpretation of the experiment, but when such tests were negative, there still remained the possibility that distemper virus had been present in the dog at some earlier stage of his illness. He was of the opinion that a better chance of transmitting the virus occurred in the early than in the late stages of the disease, and that in the case of *post-mortem* material the chances were not good. However that might be, it seemed to him that the number of cases of proved lapses in immunity was greater than might be expected from the recognised immunity of a dog which had survived distemper. It was essential to study all cases of failure with the greatest care, in order to be certain that the failure was a genuine lapse in immunity, and then, by improvement of technique, to try to reduce such failures to the lowest possible level.

There was no evidence—as yet—of distinct strains of distemper virus, such as had been shown to exist in foot-and-mouth disease. All strains so far studied (including one American strain) cross immunised. A dog or ferret which was immune to a strain from one source appeared to be immune to strains from other sources.

He (the speaker) was at variance with Dr. Billington's belief that a dog might have multiple attacks of distemper, just as he was completely at variance with Dr. Billington's findings regarding blood-cultures from distemper cases. In the publications of Dr. Billington which he had read, he had not found precise directions as to the methods by which *B. bronchisepticus* might be transformed into "the filter passer" or alternatively into "the streptothrix," and thus it had not proved possible for him to take stock laboratory culture of *B. bronchisepticus* and test Dr. Billington's views on this aspect of the subject.

Mr. Dalling (in reply) said that the most important point of the discussion had been raised by Mr. Comerford, namely, the question of the viability of the virus when it had reached the injector's hands. There had undoubtedly been some "breakdown in immunity," as shown by the recovery of the virus from the tissues of dogs which had been inoculated with vaccine and virus, and had later shown clinical evidence of distemper. This could be due either to the injection of vaccine of poor antigenic value, or to the use of non-living or non-potent virus. He was inclined to think that poorly antigenic vaccine had not been used, because of the rigid tests employed before the issue of any batch; on the other hand, the virus issued might have been at fault in a small number of cases. It had been found most difficult to issue virus of a constant potency. An examination of a sample of virus issued for use had

Continental Notes.

By W. P. Blount, M.R.C.V.S.,

Centenary Post-Graduate Fellow, Royal (Dick) Veterinary College, Edinburgh.

The following miscellaneous notes were compiled during a recent visit to the Continent. In terms of the above Fellowship, I worked in the laboratories of several recognised authorities on a specific subject, namely, hæmatology; but was able to attain, in addition, a knowledge of the current research work at veterinary and allied institutions.

It is not suggested that the matter contained in these notes is necessarily new to every veterinarian, but it is hoped that their recording will be of value.

Where possible, either the individual or the institution concerned has been quoted, and for the sake of simplicity the notes are appended in alphabetical order.

Adrenalin. (Dr. Seekles, Dept. of Biochemistry, Veterinary College, Utrecht.)—Intravenous injections of 1cc. adrenalin into cattle have been carried out with a view to determining its effect upon the sympathetic nervous system. The pulse rate fell from 90 to 60 in normal animals and from 125 to 65 in cattle suffering from milk fever; an effect which was deemed to be of importance, since adrenalin is usually considered to stimulate the sympathetic nervous system, whereas the result would appear to be one of vagotonicity. Similar results were noticed in calves. (*Note.*—Greig has found an apparent atypical effect with adrenalin in dogs, injections failing to relax the bronchioles in cases of asthma.)

Anæsthesia of Horses. (Veterinary College, Utrecht.)—For major operations the animals are always given chloral intravenously, followed by chloroform anæsthesia.

Anorexia. (Berlin.)—It is a common practice to give patients with simple anorexia (*i.e.*, uncomplicated by gastritis, ulceration, etc.) 15 lumps of loaf sugar *before* breakfast. It is said to be followed by a huge increase in appetite.

Beri-Beri. (Charité Hospital, Berlin.)—I was privileged to watch the examination of a Japanese student suffering from beri-beri with complications. The signs were of great interest, particularly as the patient did not speak any language other than her own.

Blood Examinations. (Charité Hospital, 1st Medical University Clinic, Berlin.)—Every patient entering the wards of this hospital receives a full blood examination, which, if considered necessary, is repeated daily.

B. W. D. Agglutination. (Dept. of Bacteriology, Veterinary College, Utrecht.)—As a routine test the "rapid method" is utilised.

One hundredth c.cm. of a highly-concentrated suspension of the bacillus in 12½ per cent. saline solution is mixed with one twentieth c.cm. of the suspected serum on a clear glass plate heated to 40° C. The mixture is then rocked for a short period and the effect noted. If the agglutination is positive large macroscopic masses of agglutinated bacilli appear amongst the clear surrounding fluid. Only in doubtful cases is the usual "tube" method employed.

Cæcum of Fowl. (Professor Mangold, College of Agriculture, Berlin.)—Investigations into the function of the cæcum of the fowl have produced very striking results, especially concerning the digestion of cellulose.

Hitherto it had been considered that the fowl did not utilise cellulose for metabolic purposes. Mangold has shown that the contents of the cæca are expelled not more than once every 24 hours, and that they possess a very high aroma, whereas the contents of the remainder of the large intestine are expelled about 9 times in 24 hours.

During a recent Scottish investigation into the death of grouse, it was found that the cæca were harbouring helminth parasites, which, from there, spread to infect the whole of the alimentary canal, death ensuing. These workers also mention that the cæca discharge their contents but once in 24 hours, thus qualifying the work of Mangold.

The peristaltic movements of the cæcum are inhibited for long periods in order to allow of digestion; later the characteristic periodic discharge of their contents follows.

The cellulose of barley is undigested by poultry, whereas that of maize is utilised.

Calorimetry. (Professor Mangold.)—The study of basal metabolism is one of the most important of this department. Nathan Zuntz, a former director of this department of physiology, invented an enormous apparatus for examining the respiratory and normal gaseous eructations of cattle simultaneously. Since the war this apparatus has been found to be too expensive to use regularly; consequently, it is not surprising to learn that they have been experimenting with smaller adjustable apparatus for the sake of economy.

A woman research worker has now evolved an ingenious calorimeter which may be used for animals varying in size from the domestic hen to the goat.

Canker. (Professor Hartog.)—The post-operative dressing favoured at Utrecht for this condition in the horse is corrosive sublimate. Acriflavine had not been used.

Colon Resection in the Dog. (Dept. of Anatomy, Utrecht.)—Professor Krediet has performed some interesting experiments which suggest that after resection of the colon the terminal portion of the ileum assumes microscopic characters identical with those of the normal colon. The operations had been in progress for over 12 months without loss of health to the animals.

The anatomical specimens in this department of all the domestic animals in their several natural attitudes, together with specimens of hermaphroditism, constitute a most interesting and instructive collection.

Destruction of Dogs. (Veterinary College, Utrecht.)—Using the ordinary city current, dogs are electrocuted daily in a special chamber, the time taken varying from one to two minutes after the current commences to act. It is thus inexpensive.

"Dust Carts." (City of Berlin.)—The system adopted by this city for the removal of house refuse is most efficient

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shown that that special ampoule had contained virus which would not infect a ferret. Because of the records of reactions noted by veterinary surgeons, it was evident that the huge bulk of the virus issued was potent, but it seemed probable that some had fallen short of the required standard to consolidate the immunity produced by the vaccine. New methods were being investigated in an attempt to improve the issue of virus.

from the standpoint of hygiene. Specially-constructed vehicles with sliding panels, which thus prevent the spread of the dust whilst the containers are being emptied, are in daily use. Their ingenious construction and usefulness are in marked contrast to the methods adopted by some of our large British towns and cities. They have one marked drawback, which is their noisiness, since they are apparently all metal.

Electrocardiograms. (Veterinary College, Utrecht.)—Professor Rose, of the Dept. of Physiology, has specialised in the use of these instruments, and is making them a prominent feature in his new department.

Ellenburger-Baum. (Hanover.)—A new edition of their text book on the anatomy of the dog is in preparation, Professor Zeitchmann replacing the late Dr. Ellenburger as co-editor with Professor Baum.

Enzymes. (Dept. of Biochemistry, Veterinary College, Berlin.)—Dr. F. F. Nord has recently published a new text book concerning the theory of the "Mechanism of Enzyme Action:" Williams and Wilkins Co., Baltimore, 8s.

It is interesting to note that, although in this department three or four full-time research workers are investigating certain medical properties of yeast, they have refrained from publishing any papers.

Eosinophiles. (Cancer Clinic, University, Berlin.)—I was privileged to be present when Dr. Hans Hirschfeld first demonstrated that the "vacuoles" so commonly seen in the eosinophile leucocytes of man were really spaces formerly containing fat, the contents of the vacuole usually being removed in the preliminary fixation of the smear with alcohol. Paris Lumière plates for demonstration in natural colour of blood cells are used with success in Berlin.

Ergosterol. (Medical Clinic, Charité Hospital, Berlin.)—Irradiated ergosterol is one of the latest empirical treatments for so-called Hodgkin's Disease of Man.

Erythrocontes. (Dr. Shröder, Berlin.)—These peculiar minute structures, seen typically as intracellular bodies in the red corpuscles of patients suffering from pernicious anæmia, have been shewn to be free from nucleoproteins, which thus disposes of the theory that they may be of nuclear origin.

Gastritis. (Charité Hospital, Berlin.)—Sixty minims of a one per cent. solution of collargol twice daily has been found, in conjunction with suspensions of bismuth, to give excellent results in the treatment of uncomplicated gastritis in man.

Glossitis of Pernicious Anæmia. (First Medical University Clinic, Berlin.)—Using the formula of certain American investigators, methyl blue with gentian violet has been found to be specific for the above condition. The intense irritation may be seen to spread to the anterior nares in severe cases.

Guttadiophot. (Professor Schilling, Berlin.)—This is an ingenious method for the detection of blood changes by the utilisation of specially-prepared dye papers. Professor Schilling uses these absorbent papers in the routine examination of blood and is confident that they are of definite clinical value. As the papers are both new and expensive few results are to hand from their use with animals. Schilling suggests that they may be of use in assisting the diagnosis of tuberculosis where the tuberculin test is doubtful but the clinical signs suggest otherwise.

Hæmoglobin. (Dr. W. Lintzel, Dept. of Physiology, College of Agriculture, Berlin.)—A new simple method for the estimation of iron in body fluids has been invented.

When mice are kept by special apparatus under reduced tension (to represent the atmosphere of high altitudes) it is found that their hæmoglobin content is doubled. Iron is normally stored in the liver, so that if their diet is deficient in iron the animals withdraw supplies from the liver: later, in suitable circumstances, restoring any excess in that organ.

Investigations are disputing certain beliefs concerning the iron content of milk. Using their new, sensitive technique Lintzel and Mangold have shown that the quantity of iron varies with the different species. Cattle have larger quantities than are usually stated, and pigs' milk is very rich in iron, but there is very little iron in the liver of young pigs. This is interesting, in the light of certain outbreaks of anæmia of young pigs in America.

The biochemical inter-relationship between chlorophyll, copper, iron and magnesium has received much prominence of late owing to the success of a certain proprietary preparation which contains them.

Hippopotamus. (Hagenbeck's Tierpark, Hamburg.)—It was noticed that the Hippopotamus could remain under the water for periods up to 80 seconds before requiring to come to the surface for more air.

Histamine. (Charité Hospital, Berlin.)—Subcutaneous injections of histamine are found to have a specific action upon the acid-forming glands of the stomach, a profuse secretion occurring in 10 to 15 minutes in healthy human beings. Use is made of this fact in differentiating the achlorhydria of pernicious anæmia, carcinoma, etc. One c.c. of a Swiss proprietary preparation, Imido, is injected *subcutis* and a quarter of an hour later the stomach contents are withdrawn: certain patients have other subjective symptoms such as headache, flushing of the face, sweating, etc.

Hypnotism.—Professor Mangold specialised some years ago on the experimental hypnotism of animals. He found that by the sudden increase of afferent stimuli to the centre for "poise" in the hind brain, animals assumed a condition of unconciousness which was of sufficient intensity to allow of major operations being performed. Mangold introduced a simple apparatus for hypnotising rabbits, and was equally successful with poultry. Dr. Waterhouse, in a recent talk on psychology from the B.B.C., suggested that the excessive fear which small animals sometimes assume when "paralysed" by their pursuers' magnitude, might be Nature's method of anæsthetising animals before death, thus eliminating the painful death apparently inevitable when a ferocious animal attacks its prey. Actually the loss of tonus both of muscle and of consciousness is one of hypnotism.

Infusoria. (Department of Physiology, College of Agriculture, Berlin.)—Mangold has shown that certain infusoria normally present in the rumen of cattle attack starch (not cellulose, which is "digested" by bacteria) converting it to glycogen. Healthy animals possess about 1,000,000 infusoria per c.cm. of rumen contents. Certain species are present normally on hay which, if fed sterilised, prevents their appearance in the rumen, which may perhaps indicate that steaming hay is not necessarily a good procedure for ruminants.

Infusoria are unicellular organisms with a definite "rind," often bearing motile flagellæ or cilia; they multiply rapidly, but never appear to exceed one million per c.cm. of rumen contents. They diminish in disease conditions, and are killed by starvation. The investigation is still proceeding.

Iodine for Poultry. (Department of Physiology, Leipzig.)—An 18-months' experiment on the influence of iodine on the growth of poultry, and also on their egg production, has so far produced absolutely negative results.

Jensen's Rat Sarcoma.—Professor Hirschfeld has transmitted from rat to rat the above type of sarcoma for over 20 years. Regular blood counts are performed, and experiments with potassium, and ultra-violet rays are in evidence.

Lameness of Poultry. (Department of Hygiene, Hanover Veterinary College.)—Experiments with vitamins B and G concerning nutritional lameness of poultry are in progress.

The museum of this department is exceptionally interesting with its models of farms, dairies, utensils, etc.

Leeches. (Charité Hospital, Berlin.)—These are used in all cases of deranged diuresis with associated enlargement of the liver. Three or four leeches applied over the right costal arch appear to increase the output of urine by 500 to 1,000 c.c. daily.

Leucosis of Poultry. (Department of Hygiene, Veterin-College, Hanover.)—Research workers in this department are investigating certain poultry disease, amongst which they have failed to qualify the blood picture of Ellerman in leucosis.

Milk Fever. (Sjollema and Seekles, Department of Biochemistry, Veterinary College, Utrecht.)—Over 600 cows have been treated by intravenous injections of Ca. Cl_2 with good results. Forty to 60 grms. of crystallised calcium chloride in 10 per cent. solution are injected; a second dose may be necessary for some cows. Other metallic salts have been tried, but with no success. Udder inflation is not resorted to, as it interferes with the secretion of milk. A few old cows die from "heart block." The lethal dose of Ca. Cl_2 is 120 grms. per cow.

Freisian cattle have a peculiar type of milk fever lasting seven days. Treatment by parathormone has been successful, and it has been found that, although the calcium content remained at 5 per cent. before and after the injection, the calcium *ion* content was raised to normal. The calcium *ion* content of the serum has been obtained using the method of Dr. Brinkman—an ultrafiltration method.

Monkeys. (Hamburg.)—It was noticed that several monkeys suffered from what appeared to be irritative fibromata of the ischial callosities: huge new growths, apparently painless, but possibly of interest to cancer research workers.

Napoleon. (Veterinary College, Leipzig.)—In the old college one of the most interesting exhibits was that of the iron horse shoes worn by the famous white horse of Napoleon at the battle of Leipzig, dated October 17th, 1813.

Proprietary Medicines. (Berlin.)—During a tour of several hospitals in Berlin it was impossible to avoid noticing the fact that proprietary medicines are very much more in favour than in this country. Each ward has its chest of medicines, about three-quarters of which were "unofficial."

Protein Value of Meat. (Department of Physiology, Veterinary College, Leipzig.)—Using rats as the experimental animals, the food value of home and imported frozen meats is being contrasted. They are fed raw, cooked, and fried, and notice is taken of increase of weight, or development of disease. This meat is their only source of protein.

Rumination.—Professor Mangold has elicited several facts of physiological importance. The vagus nerve supplies all four divisions of the stomach. One branch goes to the rumen (right), one branch to the other three "stomachs" (left), and a third special branch to the pylorus. If the two former branches are sectioned the animal will live, whereas the latter is necessary for life.

If the branch which passes down by the liver to the pylorus be sectioned it is believed that the sympathetic has full play, for the abomasum dilates and at *post-mortem* it may be larger than the rumen.

The function of the œsophageal groove had not been studied.

Salvarsan. (Department of Hygiene, Veterinary College, Hanover.)—In the treatment of infectious pneumonia of horses, salvarsan and neo-salvarsan have given good results.

Silver Fox. (Veterinary College, Leipzig.)—Dr. Sprehn has investigated the helminth parasites of the silver fox, an animal of great economic importance in Europe. Agriculture is not paying, therefore attention is directed to more remunerative considerations. Dr. Sprehn is publishing a text book on the helminth parasites of mammals, his own speciality being the cestodes and trematodes of that group. A great deal of attention is being paid to the growth *in vitro* of parasites, and suitable media have been evolved.

Spirochætosis of the Rabbit.—Bivatol, a proprietary bismuth-lipoid compound, is considered specific for this condition in Utrecht.

Splenectomy. (Professor Hartog, Utrecht.)—Splenectomy is practised with success for certain piroplasmic diseases of cattle.

Stomach Staggers of Cattle. (Department of Biochemistry, Veterinary College, Utrecht.)—Occurs usually in May. The mortality was over 70 per cent. previous to treatment with calcium; now about 30 per cent.

The calcium content lies between 6 and 7 per cent., whereas it is as low as 4 per cent. in milk fever, the normal amount being about 10 mgs. per c.c.

The magnesium content is very low, ·4 per cent. (milk fever, magnesium 2·2 per cent., and the normal values lie between 1·6 and 2·3 per cent.).

Treatment by injection of magnesium has failed, but the injection of some 200 to 300 c.c. of a 10 per cent. solution of calcium chloride has given some good results.

Vitamins. (Department of Physiology, Leipzig.)—The normal vitamin value of foods common to Germany has been studied. Rats, guinea-pigs, mice, pigeons and poultry were used as experimental animals.

It is of interest to note that when rats refuse their supply of raw potato (to supply vitamin C) they are actually forcibly fed; the procedure was not without its humorous aspect.

The whole department, which was originally built for metabolism work is now converted for investigation of vitamins—the second factor again being predominant.

X-Rays. (Utrecht.)—When it is desired to examine the kidneys radiographically, the abdomen is first distended with oxygen. This elevates the intestines and so allows a better picture of the organs to be obtained.

The Veterinary Record.
May 31st, 1930.

Bovine Tuberculosis.

In view of the heavy incidence of tuberculosis in the dairy herds of this country, the great loss incurred by those engaged in stock industry, and the even more serious reflection of the disease on the health of the rising generations of the community, the West of Scotland Division of the National Veterinary Medical Association some few months ago put forward a scheme whereby Bovine Tuberculosis could not only be minimised but finally eradicated from our herds. The scheme, based on a diagnostic separation of infected from non-infected, by means of the tuberculin test, was very ambitious and complete even to the point of a drastic handling of a situation which, under milder methods of control, has resulted in no appreciable diminution in the prevalence of the disease. The procedure suggested followed the lines which have shown such marked success in the United States of America and in Canada. The scheme was submitted to all divisions of the National Veterinary Medical Association for discussion, and though there has been variance of opinion as to the practicability of the scheme in this country, owing to the much higher incidence of the disease than in either the U.S.A. or Canada, and that the cost of general application would render the proposals in their entirety prohibitive, it may be taken for granted that the veterinary profession as a whole agrees to, and will support, a more rational and effective policy in respect to bovine tuberculosis than exists at present. The West of Scotland Division is to be congratulated on being the first to enunciate a policy which definitely attempts to eradicate tuberculosis from our herds. This policy in detail has been carefully considered by other divisions in Scotland, and the scheme as it now stands has been submitted by the Scottish Branch of the National Veterinary Medical Association. As such, it was published in the *Veterinary Record* of April 12th, and public interest in Scotland has been aroused by circulation to Scottish Members of Parliament, Scottish Government Officers, Agricultural Bodies in Scotland, the Scottish Agricultural Press, the Daily Press in Scotland and the Scottish Cattle-Breeding Societies. It has been approved by the Central Executive of the National Farmers' Union of Scotland, and a special committee from that body was appointed to confer with the Scottish Branch, N.V.M.A., in order to adjust details.

That public opinion in England has been stirred, not only with regard to the loss occasioned to the live stock industry of the country by the ravages of tuberculosis, but to the serious reflection of the disease on human health, may be gathered from the debate in Parliament on the Agricultural Vote on Monday, May 12th, which was published *in extenso* in last week's issue of the *Veterinary Record,* and which may be taken as an indication of contemplated action. In the issue of the *Veterinary Record* of May 3rd, it will be noted, too, that a sub-committee of an organisation termed the People's League of Health and consisting of several well-known Medical, Veterinary, and Parliamentary Authorities, are making a survey of the situation of tuberculosis of bovine origin in Great Britain. Also the Medical Research Council is giving support to an inquiry into the incidence of tuberculosis in herds in Scotland, an area in Ayrshire having been selected, and the field work being conducted under the direct supervision of Mr. Jordan, M.R.C.V.S., Veterinary Pathologist, Hannah Dairy Research Institute (*Veterinary Record,* April 19th, page 348).

There can be no doubt that the present incidence rate of bovine tuberculosis and of human tuberculosis of bovine origin is most unsatisfactory. The loss on the Agricultural and Veterinary side of 52,222 bovines during the three years 1926-27-28, slaughtered under the Tuberculosis Order of 1925, with probably at least twice that number not reported but otherwise disposed of, and the estimation that 40 per cent. of the cows of our dairy herds producing milk for human consumption are tuberculous, are circumstances in themselves that call for immediate attention. But when to this is added evidence from recorded statistics (A. S. Griffith and others) that in England 31·5 per cent. of tuberculosis in children up to 15 years of age is of bovine origin, that 57 per cent. of cervical adenitis in the same ages is of

Zootechny Department.—Dr. van der Plank, of this department in the Veterinary College, Utrecht, has commenced investigations into the metabolism of poultry, and the importance of vitamins. It will be noticed that very much more importance is attached to the study of the domestic hen in Germany and Holland than in this country.

bovine origin, that 33 per cent. of bone and joint tuberculosis in children under 5 years and 24 per cent. in children from 5 to 10 years is of bovine origin, that approximately 30 per cent. of the deaths from tuberculosis in children under 5 years is of bovine origin, that in Scotland certain hospitals have recorded as much as 90·3 per cent. cervical adenitis, and 61·2 per cent. bone and joint tuberculosis in children up to 12 years to be of bovine origin, it is high time that serious action should be taken with regard to this grave menace to public health. There is no need to be unduly alarmed at the figures quoted, but they unquestionably disclose the necessity for particular State inquiry and action by the Ministries of Agriculture and Health combined, and representatives of Medical, Veterinary, Agricultural, Municipal, and State public health interests; taking evidence from all parties concerned, perfecting those ordinances which already exist in part control, and adopting others which will attack the disease at its source. This grave stigma on the value of medical and veterinary science, this unsatisfactory outcome of a policy that is inadequate to meet a deplorable situation, must suffer the change that common-sense and sound judgment would suggest. Veterinary science is prepared to show a way by means of which tuberculosis in animals can be brought within limited proportions, and to all intents and purposes finally eradicated. It is needless to add that *pari passu* there would be diminution and a disappearance in human beings of that form of tuberculosis attributable to bovine infection. It is, however, only by a commensurate recognition of responsibility by the State that this happy condition of affairs can be effected. Eradication is possible only through direct Government enactments and through Government machinery which would seal the confidence not only of those who would be required to implement policy, but of owners of stock, who are equally concerned, and for whom an educative policy is specially desirable. It is to be hoped that with the march of time bovine tuberculosis will have disappeared into the oblivion that has been the fate of other animal diseases.

The reply of Dr. Addison, Parliamentary Secretary in the present Government, to the debate in the House of Commons on the Agricultural Vote, previously mentioned, is very helpful and foreshadows a desire that animal disease problems should receive that due amount of attention in elucidation of cause and effect which will make for their better prevention and control and be the saving of "not thousands of pounds but millions of pounds and that statement is no exaggeration."

Clinical and Case Reports.

Calcium Gluconate Treatment for Milk Fever.

By T. Le Q. Blampied, F.R.C.V.S., St. Helier.

In confirmation of what has already been published by Professor J. Russell Greig, I wish to report that the following milk fever cases that have been treated with calcium gluconate.

All my clients who have had cases so treated are loud in their praise of the results of this discovery, which, in my opinion, has solved the problem of the cause of milk fever, and introduced this scientific cure which will in future not expose the udder, the most valuable part of any pedigree cow, to risk of infection or affect the year's lactation.

I only visit a milk fever case twice if I am specially requested to do so. This accounts for my not being able to give the exact time each cow got up, but this, I think, varies, as it does with inflation.

Case No. 1.

Genee.—February 15th.—11.30 a.m.—Cow down, semi-comatose; unable to hold up head. Injected 3 oz. calcium in 2 pts. water subcutaneously. 12.15 p.m.—Cow able to hold up head. 2.30 p.m.—Able to rise and stand normally.

Case No. 2.

Riley.—February 18th.—This cow had suffered from zinc poisoning and the symptoms were not the ordinary symptoms of milk fever. Calved early on February 17th. February 18th.—Cow down and stretched out and struggling. 9 a.m.—Injected 25 gms. calcium intravenously, 1½ oz. in 1 pt. water subcutaneously. 12 noon.—Cow worse; jaws set tight, still extended full length, although she was continually being propped up. Udder inflated. 4 p.m.—Cow brighter; still down, but holding up head. Remained down until the morning of the 21st, after which she made slow and gradual improvement. I feel certain the zinc poisoning was the cause of her being down so long after milk fever had passed off.

Case No. 3.

Mourant.—February 2nd.—5 p.m.—Cow on her feet but unsteady. 9 a.m.—Injected 37 gms. calcium intravenously. Immediately recovered. Cow started eating at once.

Case No. 4.

Le Boutillier A.—February 20th.—11 a.m.—Cow on her feet, but unsteady and cold. Injected 3 oz. calcium in 2 pts. water subcutaneously. Cows warmed up and took some food. February 21st.—9 a.m.—Cow down, comatose. Inflated the udder; she remained down until 9 p.m., but recovered without further treatment.

Case No. 5.

Farrell.—February 19th.—Cow on her feet but unsteady. Injected 3 oz. calcium in 2 pts. water subcutaneously. Recovery uneventful.

Case No 6.

Perredes I.—March 1st.—12 noon.—Cow down, no coma. Injected 3 oz. calcium subcutaneously. March 3rd.—Cow on her feet and doing well. Recovery uneventful.

Case No. 7.

Le Gallais A.—March 1st.—8. p.m.—Cow on her feet, staggering. Injected 2 oz. calcium subcutaneously Started eating within 5 minutes. Recovery uneventful.

Case No. 8.

Hervé.—March 3rd.—12 noon.—Cow down, comatose. Injected 3 oz. calcium subcutaneously. 4 p.m.—Cow on her feet and doing well. Recovery uneventful.

Case No. 9.

Querée.—March 6th.—9 a.m.—Cow down, comatose. Injected 3 oz. calcium subcutaneously. 10.30 a.m.—Cow on her feet. Recovery uneventful.

Case No. 10.

Du Nal.—March 6th.—10 a.m.—Cow down, comatose. Injected 3 oz. calcium subcutaneously. 5.30 p.m.—Cow on her feet. Recovery uneventful.

Case No. 11.

Perredes II.—March 14th.—Cow down but conscious. 8 a.m.—Injected 3 oz. calcium in 2 pts. water subcutaneously. In this case the calcium was not completely dissolved and did not become absorbed. 3 p.m.—Cow still down, no change. Inflated the udder. March 15th.—Cow still down and remained so until the morning of the 16th. I then injected 12·5 grms. calcium intravenously. Cow on her feet within an hour.

Case No. 12.

Touzel.—March 16th.—6 p.m.—Cow down, no coma. Injected 2 oz. calcium in 2 pts. water subcutaneously. 10 p.m.—Cow on her feet. Recovery uneventful.

Case No. 13.

Le Boutillier B.—March 20th.—3 p.m.—Cow down, comatose. Injected 3 oz. calcium in 3 pts. water subcutaneously. 8 p.m.—Cow on her feet. March 22nd.—10 a.m.—Cow unsteady. Injected 12·5 gms. calcium intravenously.

Case No. 14.

Poindgestre.—March 21st.—8 p.m.—Cow down, no coma. Injected 12·5 gms. calcium intravenously, and 2 oz. subcutaneously. March 22nd.—Cow still down. Injected 12·5 gms. intravenously. March 23rd.—Cow still down, but eating. This cow seemed quite recovered, but as she could not get up I inflated the udder. She was eventually slaughtered. A *post-mortem* revealed fracture of the neck of the femur in the region of the fovea capitis.

Case No. 15.

Renouf.—March 22nd.—12 noon.—Cow down, coma. Injected 12·5 gms. calcium intravenously and 3 oz. calcium in 3 pts. water subcutaneously. 3 p.m.—Cow on her feet. March 23rd.—Cow doing well. Recovery uneventful.

Case No. 16.

Fauvel.—March 31st.—Cow down. Given 12·5 gms. calcium intravenously, 3 oz. subcutaneously. Uneventful recovery.

Case No. 17.

Le Brun.—April 2nd.—9 a.m.—Cow down. Given 3 oz. calcium subcutaneously. Noon, cow still down. Given 12·5 gms. calcium intravenously. 3.30 p.m.—Cow got up. Recovery uneventful.

Case No. 18.

Bisson.—April 4th.—3 p.m.—Cow down, comatose. Given 12·5 gms. calcium intravenously, 3 oz. subcutaneously. 8.30 p.m.—Cow got up. Recovery uneventful.

Case No. 19.

Cabot A.—April 7th.—Cow down. Given 12·5 gms. calcium intravenously, 3 oz. subcutaneously. Cow got up within 3 hours. Recovery uneventful.

Case No. 20.

La Riche.—April 14th.—Cow staggering, not down. Given 3 ozs. calcium subcutaneously. Recovery uneventful.

Case No. 21.

Gallichen.—April 15th.—Cow down. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 22.

Power.—April 16th.—3 p.m.—Cow down, comatose. Given 15 gms. calcium intravenously, 3 oz. subcutaneously. Recovery uneventful.

Case No. 23.

Moulin.—April 17th.—Cow staggering. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 24.

Blanchet.—April 18th.—Cow staggering. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 25.

Cabot B.—April 19th.—Cow down, comatose. Given 15 gms. calcium intravenously, 3 oz. subcutaneously. Cow got up in two hours. Recovery uneventful.

Case No. 26.

Bouillier.—April 21st.—Cow staggering. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 27.

Langlois.—April 22nd.—Cow down. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 28.

Vautier.—April 24th.—Cow down. Given 3 oz. calcium subcutaneously. Remained down 12 hours. Recovery uneventful.

Case No. 29.

Merhow.—April 25th.—10 p.m.—Cow down before calving. Given 3 oz. calcium subcutaneously. 3 a.m.—Cow calved and got up immediately after. Recovery uneventful.

Case No. 30.

Le Gallais B.—April 27th.—Cow down, comatose. Given 15 gms. calcium intravenously, 3 oz. subcutaneously. Cow got up in 3 hours. Recovery uneventful.

Case No. 31.

Le Cornu.—April 28th.—Cow down, comatose. Given 15 gms. calcium intravenously, 3 oz. subcutaneously. Recovery uneventful.

Case No. 32.

De la Haye.—April 30th.—Cow down. Given 3 oz. calcium subcutaneously. Recovery uneventful.

Case No. 33.

Allez.—May 1st.—Cow staggering. Udder had been inflated previous day by owner. 8 p.m.—Given 3 oz. calcium subcutaneously. Next morning cow completely recovered.

Case No. 34.

Bree.—May 3rd.—Cow down, comatose. Given 15 gms. calcium intravenously, 3 oz. subcutaneously. Cow remained down all day. Next day cow was helped up and is doing well.

Summary and Discussion.

Of these 34 cases, 28 completely recovered with one injection of calcium gluconate (Sandoz); 2 recovered with 2 injections. Of the remaining 4 cases, No. 2 did not present a fair trial for the calcium treatment, as this case had recently been suffering from zinc poisoning. No. 4 showed definite relapse. No. 11 a resistance case; both methods of treatment were employed without much effect for 48 hours. No. 14 recovered after 2 calcium injections; but udder inflation was resorted to, as she did not rise.

In my limited experience with this treatment, I have found that where there is any indication of coma it is best at once to administer both intravenous and subcutaneous injections, but when there is no coma subcutaneous injection alone will suffice. The strength I use for subcutaneous injections is 1 oz. calcium to 1 pint of boiling water, as I find that when used in more concentrated solutions it is not so quickly absorbed and is likely to set up local irritation, which may persist for a few days.

In conclusion, I would like to add my hearty congratulations and thanks to Professor J. Russell Greig on the success that has crowned his work, in which he has been so ably assisted by Dr. Dryerre and Dr. N. C. Wright.

Comminuted Fracture of the Patella in a Horse.*

By J. Adamson, Junr., Royal Veterinary College, London.

Subject.—Thoroughbred chestnut gelding, aged nine years.

History.—Whilst returning from morning exercise the horse was attracted by the actions of two other animals in a field by the roadside. He ran away down a slight gradient on a tar macadamized surface, and on slipping came down on his side. On rising he was very lame on the off hind leg.

Symptoms.—The animal was suffering considerable pain and sweating profusely. He moved with difficulty on three legs. There was a deep wound on the outer aspect of the tibia just below the stifle joint. On palpation in the region of the patella, fragments of bone could be felt and movement was accompanied by crepitation.

Diagnosis and Prognosis.—Comminuted fracture of the patella; the owner was advised to have the animal slaughtered immediately.

Post-mortem.—This showed that the muscles covering the outer aspect of the thigh were extensively bruised and the patella was broken into about 20 fragments. The trochlea of the fenur had a small piece chipped off both its borders.

* Cases submitted for award under the N.V.M.A. Clinical Prize Scheme for Students (1929).

Abstracts.

[**The Relationship between Undulant Fever and Epizootic Abortion.** Journal of Comparative Pathology and Therapeutics. 1929. Sept. Vol. 42. No. 3. pp. 208-211. *Trop. Vet. Bull,* March, 1930.]

When the etiology of epizootic bovine abortion was established by Bang and Stribolt in 1896, and the possibility of transmission of the infection to other animals was established, there was reason to ask whether the human subject might also become infected. Abortion was considered the important clinical feature, and epidemiological evidence failed to indicate that there was any similar condition in the human subject. It therefore seemed justifiable to consider that bovine abortion was not transmissible to the human subject.

An error in nomenclature was partly responsible for the delay in recognizing that such transmission was possible. The organism responsible for the disease now known as undulant fever was originally described as a micrococcus, whereas it is in fact a bacillus. It has been found that the resemblance between the two organisms is much closer than one of morphology only. Culturally, serologically and as regards pathogenicity the organisms bear a very close resemblance to each other. There is still, however, a doubt as to whether the organisms belong actually to the same species.

Originally Malta fever, as it was called, was detected as a disease of goats and the proof of its transmission to man through the medium of goats' milk was forthcoming. During recent years the area in which the disease of human beings is known to occur has extended widely, but it has almost invariably been connected with goats. Important facts in connection with the disease in goats are that it is afebrile and abortion frequently occurs. In the human subject the temperature chart is characteristic, and the disease may last for many months.

The confidence that undulant fever was an enzootic disease affecting only goats among the domesticated animals was shaken by the discovery that cases of what appeared to be undulant fever were occurring in various parts of the world which were quite unconnected in any way with goats or their milk.

In a number of these cases serological and other tests indicated that the patients were suffering from infection with *B. abortus.* While it has been shown that typical undulant fever resulting from the ingestion of goat's milk occurs in the south-western part of the United States, the typical disease occurs in other parts quite independently of any contact with goats. It is not known for how long these cases have been occurring.

In 50 per cent. of such cases (33 in all) investigated there was traced some connection with a bovine herd infected with abortion.

More recently Kristensen has tested samples of sera suspected of typhoid infections with *B. abortus,* and about 10 per cent. of the samples yielded positive results.

Of the 2,150 patients tested, 172 were positive to typhoid and 126 to paratyphoid B, so that it would appear that infection with *B. abortus* (222 cases) is actually more frequent than either of the other two. In the immense

majority of cases sera positive to *B. abortus* were negative to the other two organisms, and of 27 cases in which blood culture was resorted to 18 yielded *B. abortus*.

In 209 instances information was available as to the probable source of infection, and in 171 of these there had been risk of infection from bovine sources. In no instance did more than one case occur in a family, and in no part of the country were cases especially numerous.

Investigations in the United States, Holland and Sweden have had similar results. Finally, cases of what appear to have been undulant fever have occurred in England, and these must have been contracted locally.

These facts are serious, but need not occasion panic. There has been no sudden change in the circumstances, but these have been rather suddenly apprehended.

Even in Malta, before precautions were taken, the incidence of the disease was less than 5 per cent., when 50 per cent. of the goats were infected. It is a possibility that bacilli from bovine sources are less virulent for man than those from goats.

In Sweden the disease has been made notifiable, and doubtless when attention is turned to the disease in this country it will appear to become more frequent, and there will be a danger of hasty and ill-considered action.

Fortunately, as far as the risk attaching to milk is concerned, it can be obviated readily, because heating to a temperature far below the boiling point can be relied upon to destroy the bacilli.

[**Tuberculosis of the common Crow.—A preliminary Study.** C. A. Mitchell and R. C. Duthie (*Amer. Rev. Tuberc.*, 19 (1929), *No.* 2, pp. 134-139. *Exp. Sta. Rec.*, March, 1930.]

The authors report having received 36 common crows (*Corvus brachyrhynchos*) in February, 1928, from Western Ontario, Canada, where crows were reported to be dying in large numbers from a disease simulating " ocular roup " of domestic birds. Upon *post-mortem* examination 5 crows were found to have fairly extensive and well-defined lesions of tuberculosis. In four of the five the lesions were confined mainly to the liver with a very moderate invasion of the spleen and relatively few acid-fast bacilli present. In an examination of four crows captured at Ottawa in the summer of 1928, one revealed a few small tuberculous lesions of the liver containing acid-fast micro-organisms similar to those found in the crows from Western Ontario. Thus, 15 per cent. of the 40 crows examined showed well-defined tuberculous lesions in which acid-fast micro-organisms could be demonstrated. The results of inoculation experiments with the organisms are reported in detail in tabular form.

[**Memorandum of Horse Sickness Immunisation.** Whitworth (S. H.). *Kenya Dept. of Agric. Bull No. 8d of* 1929. 7 pp. *Trop. Vet. Bull.* March, 1930.]

The inoculation of horses and mules by the simultaneous method has certain disadvantages, and is in some instances difficult to carry out.

The inoculation may set up the disease in a mild, moderate or even a severe form. The risks of inoculating protozoan parasites can be obviated by keeping the virus before use. The risk of transmitting pernicious anæmia must be countered by storing the virus for many months before use, because the virus of pernicious anæmia may persist for a year.

Horse sickness immunization may be followed by liver atrophy which terminates fatally. The connexion between these two has not been cleared up.

The method is expensive because large quantities of serum are necessary and because it is essential that it be ascertained that the serum is not hæmolytic. The maintenance of virus is also a matter of expense. Experiments have been begun to test the value of formalized spleen as a vaccine, but the cost of equines in Kenya forms a great barrier to work on an extensive scale. Pulped spleens are mixed with sterile normal saline (4 c.c. per gramme), and then toluol, toluol and formalin, or formalin are added and the mixtures shaken and incubated.

Details of a small number of experiments with the various vaccines are given.

Spleen pulped and treated with varying proportions of formalin from 1 to 100 to 1 to 1,000 of the spleen mixture failed to produce symptoms or temperature reactions in a small number of horses.

[**The Diagnostic value of Bacteriological Meat Inspection findings.** Gruitner, Felix, *B.T.W.*, 1930, 38, 16, 241-5.]

A bacteriological investigation allows one to determine the presence of the food poisoning group (paratyphoid—Gärtner) of bacilli which are of definite danger to human life.

J. H. M.

[**Intravenous morphine narcosis in the Dog.** Freese, Walter, *B.T.W.*, 1930, 38, 16, 245-6.]

By this method narcosis is produced more quickly and without previous vomiting or retching. There is, however, a period of great excitement prior to the narcosis.

J. H. M.

A National Organisation of " Grade A" Milk Producers.

A decision to form a national association of grade A milk producers was made at a conference of representatives from 18 counties, held at the offices of the National Farmers' Union, Bedford Square, London, recently. It was convened at the instance of the Yorkshire, Leicestershire, and Lancashire Grade A Milk Producers' Associations, the object being to create a great organisation to resist any attempts to alter the present designation of graded milks that might be to the disadvantage of members.

The resolution to form a national organisation was carried unanimously. The chairman, Mr. Howard Coltman, of Leicestershire, with Mr. J. Baum, Hertfordshire; Colonel Cohen, Sussex; Mr. J. R. Rhodes, Yorkshire; and Mrs. Hollas, Lancashire, were appointed a sub-committee to place the case of grade A milk producers before the Ministry of Health in opposition to any proposals for the alteration of designations of graded milks. If the Ministry of Health insists on a change in the designation, the sub-committee was instructed to state that the grade A producers were prepared to accept a reduction in the bacterial standard to that of the certified producers of milk.

The National Food Canning Council state that a tin of food canned 40 years ago has just been opened and found in good condition.

Translation.

The Rontgen-ray Picture of the Ruminant's Abdomen.

By A. Czepa and R. Stigler.*

SUMMARY.

Three goats, one a pregnant female several years old, a one-year-old male and a young kid were X-rayed laterally. For the observation of the stomach and intestinal movements the goats were fed, prior to X-ray examination, with a mixture of barium sulphate and potato pulp or with a watery paste. In some cases the barium sulphate was put up in a gelatine capsule which enabled the subsequent movement of a swallowed morsel to be studied.

1. Respiratory movements.

During respiration abundant movement of the diaphragm together with its orura can be observed. This occurs occasionally on inspiration at two periods, but practically no movement of the ribs can be seen. Accordingly, the goat's breathing seems to be predominantly diaphragmatic.

2. Two forms of stomach movement, fundamentally different, must be distinguished:—

(*a*) Peristaltic waves; they are seen in the X-ray picture over the rumen and the pars pylorica of the abomasum, but never over the reticulum (second stomach).

(*b*) Extensive and rapid contractions of the whole gastric section at once, but especially of the second stomach.

3. Movements of the first stomach—Rumen.

The right ventral and left dorsal compartments contract alternately, to a considerable extent, so that of the right ventral compartment only a shadow about the size of a fist remains visible in the picture. These two compartments never contract at the same time. Variation occurred in the duration of the separate pauses, when both compartments were relaxed at the same time.

4. Movements of the second stomach—Reticulum. This stomach contracts apparently independently of the rumen. The contractions are very strong and extensive and occur always in two periods, first to the volume of the size of a small apple, then, after a very brief rest in this condition, until the lumen has almost completely disappeared. Immediately afterwards it completely relaxes and generally fills with liquid or semi-liquid contents, which rush from the rumen and entirely fill the second stomach and expand it. Then follows a pause.

5. Movements of the third stomach—Omasum. There is no change in shape or size of this stomach.

6. Abomasum (fourth stomach)—fundus, corpus, pars pylorica.

After the administration of barium sulphate, the contents show three layers—clear air, a grey layer of liquid in the middle, and below, a dark shadow of sedimented barium sulphate. The air bubble is characteristic of this stomach and lies in the fundus, and differs in extent according to the size of the stomach and the air content of the food consumed. In young animals it is extraordinarily large.

The opening into this stomach from the third stomach does not lie in the top of it, but much deeper, and above it lies the air bubble.

The pars pylorica is generally separated from the body by a deep constriction extending to the pylorus and is well defined by the Röntgen ray.

Fourth Stomach Peristalsis.

Only the pars pylorica shows peristaltic waves, the deep constrictions of which give various shapes to the antrum.

There are usually four waves at the same time.

7. The duodenum.

At the entrance is a longitudinally-stretched, generally tightly-packed, bulb-shaped distension—the bulbus duodeni. Between it and the antrum pyloricum the Röntgen ray shows a clear oblique space which is only intersected by the pylorus. This generally appears as a short dark line.

8. The colon.

Peristalsis of the colon appears very clearly in two ways (*a*) Circular folds of the mucous membrane can be seen even without using Ba SO_4, are lifted up by the air bubbles in the colon as diagonally running, arc-shaped streaks and slowly move slightly to and fro; (*b*) Moreover, on filling the colon with a contrasting mass it is seen that it contracts slowly until the lumen is completely obliterated and expands again at intervals.

9. The frequency of contraction of the separate sections of the goat's stomach.

(*a*) Rumen. We counted the movements in the dorsal compartment in a one-year-old male. A to-and-fro movement of the posterior wall lasted 10 seconds; then followed a pause which varied, but averaged 17 seconds.

The duration of the rumen contraction is thus more constant than that of the pause between the individual contractions (analogous to the length of systole and diastole of the heart).

In agreement with our other observations we counted about two rumen contractions to the minute.

(*b*) Reticulum.

The frequency of the movements of this stomach was very easy to determine even without feeding with a contrasting mass because, at each contraction of the reticulum, the air bubble of the abomasum moved backward in a curve. The duration from the beginning of the contraction to complete relaxation of the reticulum (*i.e.*, complete contraction of the outer opening of the rumen) was 4-6 seconds in our one-year-old male and the average duration of the following pause 32 seconds. There were, therefore, rather less than two contractions per minute.

In the pregnant female we saw one reticulum contraction per minute, in a two-months-old female goatling five contractions in six minutes 38 seconds.

(*c*) Omasum. Movements cannot be seen in the Röntgen picture.

(*d*) Abomasum.

In one-year-old male, ten antrum waves in 87 seconds, about seven to the minute, over a certain place in the big curvature.

10. Route of food swallowed.

(*a*) Liquids. We confirmed Wester's findings that young

* Prepared for publication in the *Record* from *Archiv. f.d. gesamte Physiologie*, 212, 300-356 (1926), by W. L. Little, F.R.C.V.S., and Miss D. Knight.

animals as a rule drink directly into the omasum and abomasum, but older ones only into the reticulum and rumen. Our 3-4-year-old drank directly into the abomasum, but at about one year it drank only into reticulum and rumen. The old goat drank almost always into the two first, and the young one into the two last stomachs.

On swallowing, the contrasting liquid runs very quickly into the œsophagus and in young animals directly through the groove and omasum into the fourth stomach, but even in old animals which only drank into the first two stomachs one sees the groove of the omasum and eventually even the whole omasum filled with contrasting liquid and this remains close to the entrance to the fourth stomach.

It does happen occasionally in old animals that liquid reaches the fourth stomach on drinking, on the other hand, even in young animals liquids reach the rumen and reticulum :—

(1) If the fourth stomach is already overfull.

(2) If the animal is given too much liquid at once.

(3) If the animal during the act of swallowing coughs as a result of accidental pressure of liquid in the larynx.

Thus by the intake of large amounts even in quite young animals all four stomachs are filled with contrasting liquid.

(*b*) Solid food.

A solid bolus remains as a rule in the neighbourhood of the cardiac end of the stomach after leaving the œsophagus in both old and young animals, passes from there into the reticulum or rumen, or immediately after swallowing passes directly into the rumen and from there into the reticulum, or it migrates into another part of the rumen. It only depends on the movement of the first stomach at the time which route the food takes. No rule can be laid down.

The only rule is that the swallowed bolus remains in the neighbourhood of the œsophageal opening in the stomach even if only for a short time. But it may also happen, at least with young animals, that solid well-formed boluses shoot out of the œsophagus through the groove into the third and fourth stomach.

When at length solid bodies reach the reticulum and rest obliquely at the bottom of it, they are removed, especially in young animals whose reticulum is still small. If the swallowed foreign bodies are pointed it may happen that they pierce the wall of the reticulum and eventually the heart, which is seen to be very closely situated in the Röntgen picture.

In its course through the rumen, the bolus shows no definite rotation nor twisting movement.

11. We do not agree with Wester's opinion that the liquid and semi-liquid contents of the second stomach pass through into the third and fourth stomachs by means of suction exercised by the third stomach on the contents of the second stomach through its sudden relaxation after the contraction; because the weak walls of the relaxing omasum can exert no sucking action, only a stiff-walled balloon could exert such an action in a similar case, if it returned to its condition of equilibrium after being pressed together.

12. The swallowed liquid reaches the fourth stomach not only through the channel of the omasum but also by the space between the folds.

13. ***Duration of the passage of liquid through the separate stomach and intestinal sections.***

The aqueous barium sulphate pastes enter directly after the filling of the fourth stomach into the duodenum and after a few moments a large proportion can already be found in the jejunum. Three hours after the filling of the fourth stomach with contrasting liquid it is empty as a rule, and its whole contents have already passed into the intestine. At this time the filling of the colon begins and 24 hours later the barium sulphate is almost only in the colon in the form of the well-known goat fæces pellets. After a further 24 hours no barium sulphate can be seen in the colon, at all events, no traces are left clinging to the under wall of the rumen and fourth stomach.

14. The Röntgen picture of quite young (four weeks) goats shows the very large fourth stomach with an especially voluminous air bubble, and slight unfolding of all the other stomachs. The stratification of the contents of the fourth stomach is particularly well shown. The deposit of barium sulphate in the fourth stomach in milk or dilute starch paste remains for an exceptionally long time. Obviously the motility of the fourth stomach at this time is still less than with a grown animal. Further development of the goats' stomachs and their function with increasing age can be followed very well in the Röntgen picture.

15. Röntgen signs of pregnancy.

A three-months-pregnant goat showed very clearly by means of infusion of contrasting liquid (in the rumen and reticulum) that the ventral rumen section was raised at its caudal end by the uterus beneath it and was placed obliquely to its caudal wall fold.

Mr. J. L. Frood, M.R.C.V.S.—A Tribute.

The Review of the River Plate (April 18th, 1930) contains a notable tribute to the character and career of Mr. John Lamb Frood, Superintending Inspector, Diseases of Animals Division, Ministry of Agriculture. We may precede quotation from the article concerned with the interesting observation that Mr. Frood was with Mr. J. W. McIntosh, M.R.C.V.S., F.R.S.E., as his first pupil in the days when that gentleman was in practice at Dalkeith. The " Rural Contributor " to the *Review*, says :—

" The existence of foot-and-mouth disease, or aftosa, as it is generally designated here, and the possibility of the infection being carried to Britain by this country's chilled or frozen meat, caused grave concern to the home authorities who, in order to know the exact conditions under which this country's live stock were kept, and the means taken to make sure that no infected cattle were slaughtered whose meat would be exported, designated one of its most capable and competent authorities to reside in this country and study the actual conditions. Mr. John Lamb Frood was selected for that post and never did home authorities make a better selection, as he was not only a highly-qualified authority in his profession, but a perfect diplomat, and during his residence in the Argentine has made hosts of friends who will wish him and his good lady—who is equally popular with all—a very pleasant holiday in Britain, for which country they leave at an early date. Mr. John Lamb Frood, in his official position as representative of the British Ministry of Agriculture, has come in

contact with all the leading authorities in the live stock trade of this country, and by his tact and good judgment has endeared himself to everyone.

"Mr. John Lamb Frood was born in 1874 in the county of Lanarkshire, Scotland, and qualified for his veterinary degree at the Royal Veterinary College, London, in 1898. He was later in private practice in the county of Kent for two years, after which he went to South Africa during the Boer War, returning to Britain in 1902. In that year he was appointed veterinary inspector to the Ministry of Agriculture and Fisheries, in which position he remained till 1923. On the removal of the embargo against the importation of store cattle from Canada, he was selected as the representative of the Veterinary Department of the Ministry of Agriculture for duty in that country. He was three-and-a-half years in that post, in which his ability and tact won him many friends. When the question became acute as to the possibility of the infection of aftosa being conveyed to England through carcasses from South America, he was recalled from Canada. The South American Governments agreeing to have a delegate from the British Ministry of Agriculture stationed in their country, Mr. John Lamb Frood was selected for that highly-important and delicate post, which he has filled with the highest credit to himself and to the home authorities. No one could be more appropriate for the delicate mission, and he has won the highest praise from this country's authorities and leading figures in live stock circles. He arrived in Buenos Aires in April, 1927.

"Mr. John Lamb Frood, through these columns, desires to express thanks for the kindness and hearty co-operation extended to him by all officials of the various authorities he has had to meet. During his leave of absence his duties will be carried on by his assistant, Mr. R. E. Murison, who has already been in South America over a year. Mr. John Lamb Frood expects to be absent five months, and his many friends will wish him and his good lady a very pleasant holiday."

From The Veterinarian,

JANUARY, 1830.

The Symptoms and Cure of Navicular Disease in the Feet of Horses.

By Mr. James Turner, Veterinary Surgeon, Regent Street, London.

(Read at the Veterinary Medical Society, December 4th, 1829).

(*Continued from page* 466.)

I have much to point out on a particular method of shoeing, which favours the return of the navicular bone to the original station alloted for it within the hoof, but which however, must be reserved for another occasion; though I beg to be allowed simply to mention that I conceive to be an important acquisition arising from the *unfettered plan of side nailing*—I advise the adoption of the French method of nailing in that portion of the hoof which is intended to be pierced with nails, *viz.*, round the toe and outside quarter; and I have had the satisfaction of finding that it secures the shoe in its place, for three weeks and upwards, as completely as the English method of fastening high up in the crust. But it is quite necessary to acknowledge that I have, as yet, only practised it by the way of experiment in conjunction with the *unfettered system,* on very *tough* and *strong hoofs*. I believe we are indebted to Mr. Joseph Goodwin for introducing, and first recommending the adoption of, the French method of shoeing in this country. I subscribe only to the nailing part of their method, and adopt it with a view of its merits, which do not appear to have been pointed out by Mr. Goodwin, or by any other writer with whom I am acquainted. I can only explain my object by first contrasting these two well-known facts, that the English nailer invades the protecting wall of the foot, plunging his long weapons their utmost depth into it short only of the point, which comes out to form the clench nearly as high as the middle of the crust, nothing daunted: no blood follows, and therefore he suspects no danger, but repeats the assault again and again. Nor, indeed, has he done any mischief that is *visible* at the time: the horse trots away sound, and returns again in a month, still free from lameness, for a repetition of this apparently harmless operation; but the bane appears in the sequel.

And we find the French nailer an invader too, but with this important difference: his weapons are short, his grasp moderate, and his position most happily chosen, being content with dividing his hold between sole and crust.

Now these facts are well known, and have been clearly pointed out by Mr. Goodwin; but I think the conclusions which have hitherto been drawn from them are insufficient to explain the merits of French nailing. Those who may wish to know Mr. Bracey Clarke's notions of French nailing, have only to refer to his writings on shoeing, in which he condemns the French system *in toto,* but their method of nailing in particular. This scientific work of Mr. Goodwin's, giving an account of the various modes of shoeing horses, practised by different nations, contains much practical information, with all the minutiæ relating to the mechanical execution of the art of shoeing.

The view I take of the matter is this:—That nails, in a clenched state within the quarters of the hoof, are not so detrimental to the sensitive organs contained therein while the animal is in action, by occasioning concussion as has been supposed. But I believe this delicate piece of mechanism suffers from their baneful influence, by more slow degrees, while the foot is in a quiescent state, as in the stable they mechanically assist in opposing the descent of the heels of the cofin bone, by their rigidity against the wings of that bone; and therefore may be considered as the first, if not the chief, predisposing cause of the *equilibrium, or balance of weight, being lost within the foot.*

The French nails I conceive to be comparatively harmless, from the circumstance of their occupying only the margin of the crust; therefore not approaching so near to the sides of the coffin bone.

Most of the old writers on the foot of the horse remark on the constraining effect of iron and nails on the hoof; but their evil tendency is more plainly shown by Professor Coleman in his "Treatise on the foot." Nevertheless, we are indebted to Mr. Bracy Clarke's incessant and forcible declarations respecting their baneful influence, which have been published since; and yet this shrewd observer continues to *fetter* the foot with them on both its sides, although practice now shows that full one-half of this precious organ may be left *free as the air,* and yet perfectly *defended.*

The Council of the British Friesian Society has appointed a Committee to help enthusiasts of the breed to obtain bulls for the use of farmers under a system similar to that of the premium bull scheme of the Ministry. The committee may advance the whole or part of the purchase price of a bull, which will be loaned to a member of the Society, who will be able to use the animal in his herd, but who must also accept cows from neighbouring herds.

Divisional Report.

Dumfries and Galloway Division, N.V.M.A.*

Demonstrations by Mr. Stinson at Carlisle.

A general meeting of the above Division was held at the Crown and Mitre Hotel, Carlisle, on February 27th, 1930, when the following members were present:—

Messrs. A. Young (President), A. J. Millingan, W. L. Mackenzie, R. Craig Robinson, J. Bell, J. W. Wilson, R. Simpson, W. Scott, J. Ritchie, J. Brennan, G. A. Sangster, O. Stinson, W. T. Hewetson, D. S. Wishart, and F. A. Davidson (Hon. Secretary).

The members adjourned to Messrs. Harrison and Hetherington's Mart before the business meeting, when Mr. Stinson very capably gave the following bovine demonstrations.

(*a*) A cross-bred cow. Presented for diagnosis. This was a case seen by Mr. Stinson for the first time the previous day, when he recommended destruction, as she was very emaciated. His tentative diagnosis was an abdominal tumour or possibly an enlarged kidney. The *post-mortem*, made immediately after, revealed a very much enlarged cystic kidney and cystitis.

(*b*) Galloway cow, damaged teat sphincter. This was especially interesting, as one or two recent improvements in technique were given, such as the application of a special dressing (Ol. tereb. 1—Ol. olivæ 3), with careful bandaging of the teat after each application, until the wounds had healed over. Also the use of an elastic ring and thread for attaching the director to the opposite teat, to avoid its dropping to the floor should it slip through the fingers.

(*c*) Lancing, from the pharynx, of an abscess of the retropharyngeal lymph gland. The cow, which was "roaring" and showing distress obtained immediate relief after the evacuation of a large quantity of pus.

(*d*) A cow with an extensive suppurating growth on the thoracic wall just behind the elbow. The operator informed the meeting that he had dealt with several of these successfully and that they were due to a variety of causes, such as actinomycosis, pins, wire, etc. The animal was given a general anæsthetic, cast and the area cleared and prepared. The skin was resected well back from all diseased tissue, which was then carefully cut away *en bloc* right down to the ribs and cartilages. The skin was then trimmed and the cavity well packed, drained and sutures inserted. Extra packing was later required to stop excessive bleeding, which resulted from the extensive blood supply formed at the base of the growth. The tumour appeared to be a fibroma and possibly botriomycotic in origin. Mr. Stinson later reports that the wound has healed and the cow is feeding and milking well. At the time of the operation she would have been described as emaciated.

(*e*) *Post-parturient Dyspepsia.*—Mr. Stinson demonstrated his method of injecting glucose subcutaneously in the treatment of this condition. One pint of liquid glucose B.P. is dissolved in one quart of sterile water and injected, at three different points over the lig. nuchæ, with an enema syringe to which is attached a strong hypodermic needle. The object is to avoid a large awkward swelling on one side of the neck. He also recommended such an injection before a serious operation to assist in warding off shock, as was done in case (*d*)—a 5 per cent. solution being based (from 1-4 quarts as indicated).

*Received May 8th.

Other Exhibits and Interesting Cases.

An innovation was made at this meeting by asking members to bring forward specimens and interesting cases.

Mr. Craig Robinson and Mr. Wishart demonstrated parts of the spleen and lungs of a valuable hunter, which they had examined in connection with insurance. The animal had reacted to the intradermal tuberculin test and on *post-mortem* showed extensive tuberculosis. The specimens exhibited showed very extensive tuberculous deposit.

The history of this horse is being traced.

Mr. Stinson brought forward the tooth and bone removed from the gelding he operated on at the Ayr Congress in September last. Those members who studied this case then will be interested to know that the horse made a splendid recovery and has been doing heavy work for some months and feeding well.

The same member also gave a very interesting demonstration of the effect of glucose treatment in post-parturient dyspepsia, as indicated by the reaction to Rothera's test of milk from affected cows. A series of samples from several cases was tested at intervals of one or two days and in each case there was a progressive disappearance in the intensity of the colour reaction. (The Secretary might state that he has done a large number of these tests for local practitioners and has found that a faint reaction may persist for some days after an apparent complete recovery of a cow, and when this occurs it is advisable to keep the animal under observation. Also, in a herd where 'P.P.D.' is very prevalent, routine samples have been taken and a reaction has been found in cows before there were definite clinical symptoms of the disease. He also agrees with Mr. Stinson that the intensity of the reaction usually varies in direct ratio with the severity of the attack.)

Lunch was then taken at the Crown and Mitre Hotel and was immediately followed by the business meeting.

The minutes of the previous meeting were taken as read, as published in the *Veterinary Record*.

Nominations of New Members.—On the proposal of Mr. Davidson, seconded by Capt. Simpson, Mr. A. B. Kerr, Asst. County Veterinary Inspector, Cumberland, was nominated as a member of the Division.

Correspondence.—(*a*) It was decided not to send any Delegate to the Congress of the Royal Sanitary Institute at Margate in June.

(*b*) The Secretary read the communications he had sent to, and received from, the local Directors of the Animal Diseases Research Association with reference to the appointment of a Director of Research. The replies indicated that these Directors were in favour of this post being held by a veterinary surgeon. The Secretary was instructed to thank these gentlemen on behalf of the Division.

(*c*) Communications were read indicating the progress of the "Scheme for the Eradication of Bovine Tuberculosis," a sub-committee having been appointed at the last meeting of the Scottish Branch.

Next Meeting.—It was decided to hold the Summer (Social) Meeting at either Castle Douglas or Kirkcudbright on June 26th. There will be a short business meeting followed by a motor tour of the Galloway district.

OTHER BUSINESS.

(*a*) *The Council of the Royal College of Veterinary Surgeons.*—The PRESIDENT announced to the members that at the request of certain members of the profession in the North, Mr. Simpson had consented to allow himself to be nominated as a candidate for the Council of the R.C.V.S. at the next election. He asked the members of the Division to support Mr. Simpson's candidature in every possible way, owing to the fact that the Council of the R.C.V.S. was, numerically speaking, poorly represented in the north of England and in Scotland generally. He further moved that the Scottish Branch be requested to support Mr. Simpson's candidature.

Several members having spoken in support of the President's remarks, the motion was carried unanimously.

Mr. SIMPSON thanked the Division for its promise of support. He endorsed the President's remarks regarding the desirability of increased representation of the north in the Council of the R.C.V.S.

The interests of the profession were as a whole identical, but in practice there were matters concerning the welfare of the profession which came before the Council of the R.C.V.S. and upon which it was desirable that the views of members in the north should receive adequate expression.

Members of the Division were asked to assist his candidature not only by voting individually but also by canvassing support in every possible way.

(*b*) *Appointment of Director of Research, A.D.R.A.*

Mr. SANGSTER drew the attention of the meeting to the fact that a notice had been inserted in the *Veterinary Record* banning the above appointment and later it was announced that a member of the N.V.M.A. had been appointed. He had never seen any intimation withdrawing the ban and therefore it seemed very necessary that some explanation should be given by the Council at an early date. A considerable discussion amongst the members followed and Mr. MACALISTER, seconded by Mr. SCOTT, moved that no further action be taken with regard to the matter. Mr. SANGSTER, seconded by Mr. BRENNAN, moved an amendment that the Secretary be instructed to write the Council asking that all the correspondence, etc., in connection with the case be published at an early date, so that the members would be able to form their own opinions on what had taken place. The amendment was carried on a show of hands.

(*c*) The President intimated that the Treasurer was of opinion that the funds of the Division were such that an annual contribution could be made towards the expenses of their representative to the Council of the N.V.M.A. He had much pleasure in proposing that this sum be fixed for the present at five guineas. Mr. STINSON seconded and Mr. ROBINSON, in supporting the motion, suggested that the sum be made ten instead of five. Mr. Davidson said he was sorry, but as Treasurer he must restrict the contribution to five guineas for this year, but he hoped to be able to suggest an increase in the near future. The motion was carried unanimously.

The meeting concluded with a vote of thanks to Mr. Stinson. The PRESIDENT, in moving this, said he was sure that they were more than repaid for any trouble they had taken in attending that day by the knowledge they had gained from Mr. Stinson's very interesting and practical demonstration.

FRANCIS A. DAVIDSON, *Hon. Secretary.*

Free Tuberculin Test Demand.

At the recently-held annual meeting of the National Cattle-Breeder's Association a resolution was moved and seconded that much could be achieved towards the elimination of tuberculosis in dairy herds if the Government would give free tests to farmers who wished their herds tested, and it was pointed out that tuberculin-tested cows were in the minority just now, as such tests were looked upon as a gentleman's hobby, and not a commercial proposition.

The resolution was approved and the Executive Committee was asked to take up the matter and decide what action was to be taken.

With regard to the question of the elimination of the "scrub" bull, the Chairman said that he had certain private information that the Government were going to tackle this matter, and he thought that they would call a conference to which the Association would be asked to send representatives.

Mr. Robert Wallace stated that the Association had gone the length of drafting a Bill on the subject, but they did not know whether it would be acceptable to the Government. The Farmers' Union were not antagonistic to such a Bill, but they would only give their assistance when it was brought forward, and what was wanted was a committee of all societies to consider it.

It was decided that the Executive Committee should be empowered to appoint representatives to any conference on the matter that the Government should convene.

Veterinary Fees in Northants.

At a recent meeeting of the Northants County Agricultural Committee the Diseases of Animals Sub-Committee reported that Mr. T. F. Spencer had written, on behalf of the veterinary inspectors, stating that their unanimous opinion was that the amended scale of fees for foot-and-mouth disease and sheep scab inspections was fair and equitable, but that the increase in respect of these items was more than counterbalanced by the abolition of the 20 per cent. bonus, and the net result would be a considerable reduction in the present remuneration of the inspectors, who asked for a retention of the bonus. The Sub-Committee decided, however, that the revised scale should remain in operation for one year as from November last.

SWINE FEVER.

This Sub-Committee reported that the position with regard to swine fever had greatly improved. Certain suggestions from the Northants Branch of the National Farmers' Union had been considered and a suitable reply made. On the point of separating fat from store pigs there was no provision in the markets to do this. The Chief Constable has been requested to instruct the police that, in view of the prevalence of swine fever, special attention should be paid to the disinfection of vehicles and the attention of occupiers on affected premises shall be drawn to the prohibition of removal from such premises. The market authorities are to be informed of the Sub-Committee's opinion that provision should be made for store pigs to be kept separate from fat pigs.—*Kettering Leader.*

The Veterinary Inspection of Tuberculous Cattle.

At a recent meeting of the Cheshire County Council the County Medical Officer of Health was called forward to make a statement on the veterinary inspection of tuberculous cattle. This unusual course was occasioned by a resolution of the Milk and Dairies Committee to arrange for the taking of "samples of milk not exceeding a hundred in number for veterinary inspection at a total estimated cost of £300."

Councillor J. E. Evitson moved to refer back this resolution on the ground that Cheshire had not taken its part in finding out what cows were tuberculous. The Medical Officer's report showed that in the years 1922-27 non-pulmonary tuberculosis had increased in the country. The medical officers of local authorities in the county area, together with representatives of consumers, should be called together to advise on the action required.

Alderman C. S. Pain supported the reference back, saying that local authorities in the Wirral were much exercised by this question.

Councillor J. O. Garner, chairman of the Milk and Dairies Committee, said that the small amount of milk consumed in the country—less than half a pint a head—was not enough to cause tuberculosis in anyone. If they were to spend £12,000 on whole-time veterinary inspection they would make no real progress.

Dr. Meredith Young, medical officer, was then asked to come forward, and stated that veterinary inspection without subsequent bacteriological examination was "not worth twopence." Even if a cow had tuberculosis in the lungs, it did not necessarily give tuberculous milk, and of 11,000 Cheshire cows examined only 3·5 per cent. were found to be tuberculous. It was the general opinion among medical officers that whole-time veterinary inspection would bring no better results than the present system of tests.

The reference back was not carried.—*Manchester Guardian.*

. . . . . .

Mr. George Howie, F.R.C.V.S., chief veterinary inspector for Aberdeenshire, in his report for 1929, states that 237 cases of suspected tuberculosis were dealt with under the Tuberculosis Order, 1925. Of the 13 cows discovered during dairy inspection nine were found to be suffering from tuberculosis of the udder, and were, therefore, dangerous to human beings as well as animals.

The small number of affected cows found in the dairy herds during the course of inspection was a very satisfactory state of affairs from a public health point of view, and it had been found that dairy farmers, as a whole, were very ready in reporting a case of suspected tuberculosis immediately their suspicions were aroused. Frequent inspection of their herds also tended to make them more careful, and it would be more satisfactory if herds other than dairy herds could be inspected at intervals. The mere fact that an inspection was possible at any time would tend to make farmers more prompt in their notifications, especially when they more fully realised the penalties attaching to their failure to carry out the requirements of the Tuberculosis Order.

Some owners complained that the compensation granted was not high enough, and their contention seemed reasonable, when they received only £5 for a cow with a market value of £20, but they must remember that the reason why the above compensation was given was that the cow was suffering from advanced tuberculosis, and that so soon as the disease became acute the cow might have been worth nothing in less than a week.

The official return of road accidents in 1929 was issued last month, and the following are comparative figures for the past four years:—

	Killed.	Injured.	Total.
1926	4,886 ...	133,880 ...	138,766
1927	5,329 ...	148,575 ...	153,904
1928	6,138 ...	164,838 ...	170,796
1929	6,696 ...	170,889 ...	177,585

Each year more people are killed in road accidents than were killed in the fighting during the Boer War.

In Parliament.

In the House of Commons recently the following question and answer has been recorded:—

Horse Traffic, London.

Sir F. Nelson asked the Minister of Transport if he can hold out any hope of the elimination of horse traffic from some of the busy thoroughfares of London, thus affording relief from traffic congestion?

Mr. Herbert Morrison: This question was recently considered afresh by the London Traffic Advisory Committee, who arrived at the conclusion, with which I concur, that the time has not yet arrived when it would be practicable to give effect to the suggestion contained in the hon. Member's question.

R.C.V.S. Annual Meeting.

Particulars of an excursion to Dublin for the purpose of the Annual Meeting and Dinner on June 5th have been furnished to us by Messrs. Pickfords Ltd., 53-54 Haymarket, London, S.W.1.

The party will leave on Wednesday, June 4th, by the morning train to Holyhead, luncheon being taken *en route*; thence by steamer to Kingstown and rail to Dublin, arriving about 6 p.m.; dinner at Jury's hotel, rooms overnight at the same hotel or one of similar standing.

Thursday, June 5th. The morning will be at liberty until the Annual General Meeting, which will be held at 12 noon at the Royal College of Surgeons, St. Stephen's Green. Lunch will be provided at Jury's hotel at about 1.30 p.m. and in the afternoon a sight-seeing tour will be made, returning in time for the Annual Dinner at the Royal College of Surgeons at 7 p.m.

On Friday, June 6th, the return to London will be made by the daylight service *via* Kingstown and Holyhead, lunch being taken *en route*. Inclusive cost per person will be £5 14s., subject to a minimum of eight persons in the party. The price includes third-class rail fares with first-class on steamers, luncheons and accommodation as indicated, and the afternoon excursion, but not the cost of the Annual Dinner. Applications for tickets should be directed to Pickfords Ltd., 53-54 Haymarket, London, S.W.1, not later than the 31st instant.

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List of Hotels.

	Bed and Breakfast.	Per day, etc.
Hotel Elliot, 64 Harcourt Street ...	7/- ...	10/6 inclusive. £2/10/- per week.
Hotel Gerard, 37 Harcourt Street ...	6/6 ... with bath.	10/- per day. Lunch 2/6, Tea 2/6.
Hotel la Rue, 31 Harcourt Street ...	6/6 ...	12/-.
Hotel McDermott, 33 Harcourt Street ...	7/6 ...	12/- per day. £3/3/- per week.
Hotel Pelletier, Harcourt Street ...	7/6 ...	12/- per day. 3½ guineas per week
Russel Hotel, Stephens Green ...	9/6 ...	15/- per day. 4½ guineas per week.
Royal Marine Hotel,* Dunlaoghaire ...	About the same as No. 12.	
Gresham Hotel,* O'Connell Street ...	12/6 ...	———
Standard Hotel, 79-82 Harcourt St. ...	10/6 to 12/- ...	15/- per day.
Eastwood Hotel, 91 Lr. Leeson St. ...	8/- ...	12/6 per day.
Shelbourne Hotel,* Stephens Green ...	15/- ...	25/- per day. Lunch 4/6, dinner 6/6.
Hibernian Hotel,* Dawson Street ...	12/6 ...	£1/1/- per day. £6/6/- per week.

N.B.—Nos. 1 and 10 can be recommended as hotels at moderate price.

Book Early.

* First-class Hotels.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

June 2nd.—Meeting of the Editorial Committee, N.V.M.A., 4.30 p.m., at 2 Verulam Buildings, Gray's Inn, W.C.1.

June 5th.—**R.C.V.S. Annual General Meeting, Royal College of Surgeons, Dublin.** Followed by Annual General Meeting of the Victoria Veterinary Benevolent Fund. R.C.V.S. Annual Dinner.

June 5th.—Meeting of the Central Division, N.V.M.A., at 10 Red Lion Square, W.C.1.

June 6th.—Meeting of the South-Eastern Division, N.V.M.A., at the Royal Veterinary College, Camden Town.

June 13th.—R.A.V.C. Annual Dinner, Hotel Victoria.

June 13th.—D.V.S.M. Written Examinations.

June 16th.—D.V.S.M. Oral Examination commences.

July 2nd.—R.C.V.S. Quarterly Meetings.

July 3rd.—R.C.V.S. Quarterly Meetings.

July 4th.—R.C.V.S. Quarterly Meetings.

July 7th.—R.C.V.S. Membership Examination commences.

AUGUST 4th to 9th.—11th INTERNATIONAL VETERINARY CONGRESS, CENTRAL HALL, WESTMINSTER.

R.C.V.S Annual Dinner.

The prospects for the Annual Dinner in Dublin appear to be excellent. The Governor-General of the Free State has promised to attend, and among others who have accepted invitations are the Provost of Trinity College, the President of University College, the Presidents of the Royal College of Surgeons and the Apothecaries Hall, the Chief Commissioner of the Civic Guards, and others. All members from Great Britain who can manage to attend in Dublin will receive a hearty welcome.

R.C.V.S. Annual Report.

The Registrar of the R.C.V.S. asks us to publish his apologies for a clerical error in the Annual Report. The name of Mr. J. H. Patterson, of Whitburn, is given in the list of those members whose addresses are unknown. As a matter of fact, Mr. Patterson's address is correctly given in the current Register and has not been altered. The insertion of his name in the list is an unexplained accident.

R.C.V.S. Obituary.

Holmes, Christopher Thomas, Chester Street, Wrexham. Graduated, Glasgow, December 24th, 1891; died February 18th, 1930.

Unqualified Man Fined at Shields.

A charge of unlawfully using the description "veterinary," indicating that he was qualified to practice as a qualified veterinary surgeon was preferred against William Mortensen, of Bede Street, Tyne Dock, at South Shields Police Court, on May 9th.

Evidence was given that an advertisement appeared in a newspaper saying: "Animals' Ailments Attended; Bedlington Pups for Sale.—Apply Veterinary and Naturalist, Bede Street, Tyne Dock."

Mrs. Elliott, of Eelbourne Street, said she saw that advertisement, and her dog being ill she sent for defendant, who gave her a lotion for the dog's eyes, for which she paid him 4s. 6d.

She assumed from the advertisement that defendant was a qualified veterinary surgeon. The dog did not improve, and she consulted a veterinary surgeon from North Shields.

Inspector T. E. Reynolds, of the R.S.P.C.A., who visited Mortensen, said defendant stated he would treat any animal, including operations, but admitted he was not a qualified veterinary surgeon.

In defence, Mortensen said he used the word veterinary in ignorance, and asserted that he told clients he had not qualified.

A fine of £3 was imposed, and on the application of Mr. Stewart Hannay, who prosecuted for the Royal College of Veterinary Surgeons, the Bench allowed £1 1s. costs.

Farmer's Fatal Streptococcal Infection from Cow.

A verdict of "Streptococcal septicæmia arising from an infected cow" was returned at a Melksham (Wilts) inquest on Howard Gidding (44), farmer, of Whitley.

It was stated that a cowman on the farm had died from blood-poisoning about a month ago, and that two other persons had been infected. Dr. Thornton, county pathologist, reported that although it was rare for cows to carry the human strain of streptococcus, two animals had infected udders, and infection had been transmitted when the cows were milked.

The coroner said that it had been proved by this inquest that it was necessary for people who had herds of cattle to keep perpetual watch over their animals to make certain they are in good health for the purposes of producing milk.

The jury returned a verdict in accordance with the medical evidence.

R.C.V.S. Council Election.

We regret that an error occurred in the last paragraph of our note on the R.C.V.S. Council Election at page 466 of last week's issue. There are 11 vacancies on the Council as stated in the first paragraph, and members are therefore entitled to leave 11 names (not 10) in the Voting Paper. This is clearly stated on the Voting Papers which have been issued, and we trust that no one has been misled by the mistake.

Personal.

At a recent meeting of the Committee of the Hawkshead Agricultural Society, a vote of thanks was accorded Mr. J. A. Edwards, M.R.C.V.S., Ambleside, the hon. veterinary surgeon, for his services, and regret expressed on his leaving the district. Mr. Edwards has purchased a practice in Lincolnshire.

Mr. William Harris, M.R.C.V.S., Superintendent, C.V.D., Gauhati, is now in England on six months' leave. His address is c/o Lloyds Bank, Ltd., 6 Pall Mall, London, S.W.1.

Army Veterinary Service.

London Gazette—War Office—Territorial Reserve of Officers.

May 20th.—Captain E. J. Burndred, M.C., from active list, to be Captain (May 21st).

Majors T. L. Shea, C. Davenport, O.B.E., and J. J. Plunkett, O.B.E., are at present in this country on leave.

Sheep Dipping.

The Ministry of Agriculture has recently issued a new leaflet on Sheep Dipping (No. 145). Its information entirely supersedes that in the original leaflet on sheep dipping, and gives the latest information as to the life histories of ticks and other pests of sheep, together with recipes for dips and details of up-to-date methods of dipping.

The principal pests of sheep are: The Ked (*Melophagus ovinus*).—This pest, often wrongly called "the tick." is probably the most widely distributed of the parasites which attack sheep. It is a member of the same order (*Diptera*) as the house fly, but it is wingless. . . . When the maggot is deposited development is so far advanced that it at once becomes a pupa under cover of a puparium. Reproduction is slow, each female producing about three to five pupäe at intervals of a few days, after which it dies. Keds are for the most part spread by contact of one sheep with another. The mature creatures cause great irritation and loss of condition.

The Sheep Tick.—Ixodes ricinus and *Hœmaphysalis punctata* are not true insects, but belong to the *Ixodidœ*, a family of the order *Acarina*. On hatching from the eggs, ticks bear only three pairs of legs, but when mature they have four pairs. (True insects in the mature state have only three pairs of legs.) The eggs are laid in large numbers amongst damp herbage; the larvæ on hatching attach themselves to sheep or other animals, and after feeding fall to the ground and moult, after which they become *nymphœ*. Again they reach a sheep, and after feeding for a short time fall away and moult a second time, becoming adults. Once more they feed on the sheep as adults, and after gorging themselves with blood the females tumble to the ground for egg laying. When fasting they are flat, and move with ease, but the body of the female is capable of great distension and is very much larger when gorged with blood. The large ticks begin to be found when on sheep about March and reappear in autumn. They are notably common on the hill pastures of the Border districts and in the Western Highlands, though they occur also in other districts.

Lice.—Lice infesting sheep do considerable harm by cutting the wool and causing itching, irritation and unrest. The head of the louse is large and broad; the body is compressed and wingless. The louse is chiefly found on young animals or on animals in poor condition.

Maggots.—The larvæ of certain flies (especially the greenbottle *Lucilia sericata*) are a source of great trouble and loss to flock-masters during the summer months. The flies deposit their eggs in clusters amongst the wool, and the resulting maggots feed on the live flesh of the sheep. (For particulars of this pest *see* Leaflet No. 126.)

The various types of baths are fully described, from the simple hand bath for treating one animal at a time to the swim bath accommodating three to five sheep at once and in which 500 to 600 sheep can be treated in a short day's work. There are some valuable notes on experiments conducted with various dip mixtures by Professor Winter at the University College of North Wales, Bangor, and suggestions as to the avoidance of the pollution of streams as the result of sheep washing.

Copies of the leaflet may be obtained on application to the Ministry at 10 Whitehall Place, London, S.W.1.

Dorothy Temple Cross Research Fellowships in Tuberculosis.

The first award of these Fellowships, provided from a fund established by a recent benefaction in memory of Dorothy Temple Cross, will be made by the Medical Research Council, in July, for the academic year beginning on October 1st, 1930. Applications should be lodged with the Council not later than June 30th, 1930.

The object of the Fellowships, as defined in the Trust Deed, is to give special opportunities for study and research to persons "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms." Candidates must be British subjects and must possess suitable medical, veterinary or scientific qualifications. They must also be able to produce satisfactory evidence of their ability to make good use of the opportunities offered by the Fellowships.

The Fellowships will preferably be awarded to candidates who wish to conduct their studies or inquiries outside the borders of Great Britain. They will, as a rule, be awarded for one year, but in special cases may be renewed. The value of the Fellowships awarded will depend in each case upon the standing and qualifications of the candidate, but will not be less than £300 per annum, with travelling expenses in addition. It is also hoped to award one senior Fellowship of considerably greater value, and with good prospect of renewal for a further period, to a well-qualified candidate wishing to undertake intensive investigation into some special problem of tuberculosis, whether under a temperate or a tropical climate.

Further particulars and forms of application are obtainable from the Secretary, Medical Research Council, 38 Old Queen Street, Westminster, S.W.1.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Macqueen Testimonial Fund.

To the Editor of the Veterinary Record.

Sir,—The many subscribers, in this and other countries, to the above Fund will be interested to know that the Committee has arranged for a Luncheon to be given to Professor Macqueen on Saturday, August 2nd, this year. The luncheon will take place at the St. Ermins Hotel, Westminster, at 1 p.m precisely. At the conclusion of the luncheon Sir John M'Fadyean has very kindly consented to make the presentation to Professor Macqueen, which will take the form of a cheque, being the total of the subscriptions received (less a few small items of expenditure) and an illuminated address containing the names of all those who have subscribed.

The Committee hope and believe that a large and representative attendance of members of the profession will be present to do honour to our old teacher.

August 2nd has been selected for several reasons,—(1) it is the date on which it is proposed to hold the Annual General Meeting of the National Veterinary Medical Association, which will take place in the Central Hall, Westminster (a few minutes' walk from St. Ermins Hotel); (2) many members of the profession will also be in London to attend the International Veterinary Congress which commences with a social gathering the following day, and (3) not a few colonial and foreign veterinary surgeons have expressed the hope that some such date would be selected since, having secured leave to attend the International Congress, they could also attend the luncheon and renew the acquaintance after many years of their old teacher.

It has been found impossible, owing to the immense amount of work in hand, to hold the luncheon during the Congress week.

Applications for tickets, enclosing remittance, should be made to the undersigned as soon as possible in order that final arrangements may be made, but in any case not later than July 26th.

Price of tickets (exclusive of wines or gratuities) 5s.

Yours faithfully,

George W. Dunkin, *Hon. Secretary.*

Rhodes Farm, Mill Hill, N.W.7.

May 26th, 1930.